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CONTRIBUTIONS TO INDIAN BOTANY.

CONTRIBUTIONS

TO

INDIAN BOTANY.

BY

DAVID PRAIN.

REPRINTS FROM PERIODICALS, 1902-1906.

LONDON:
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1906.

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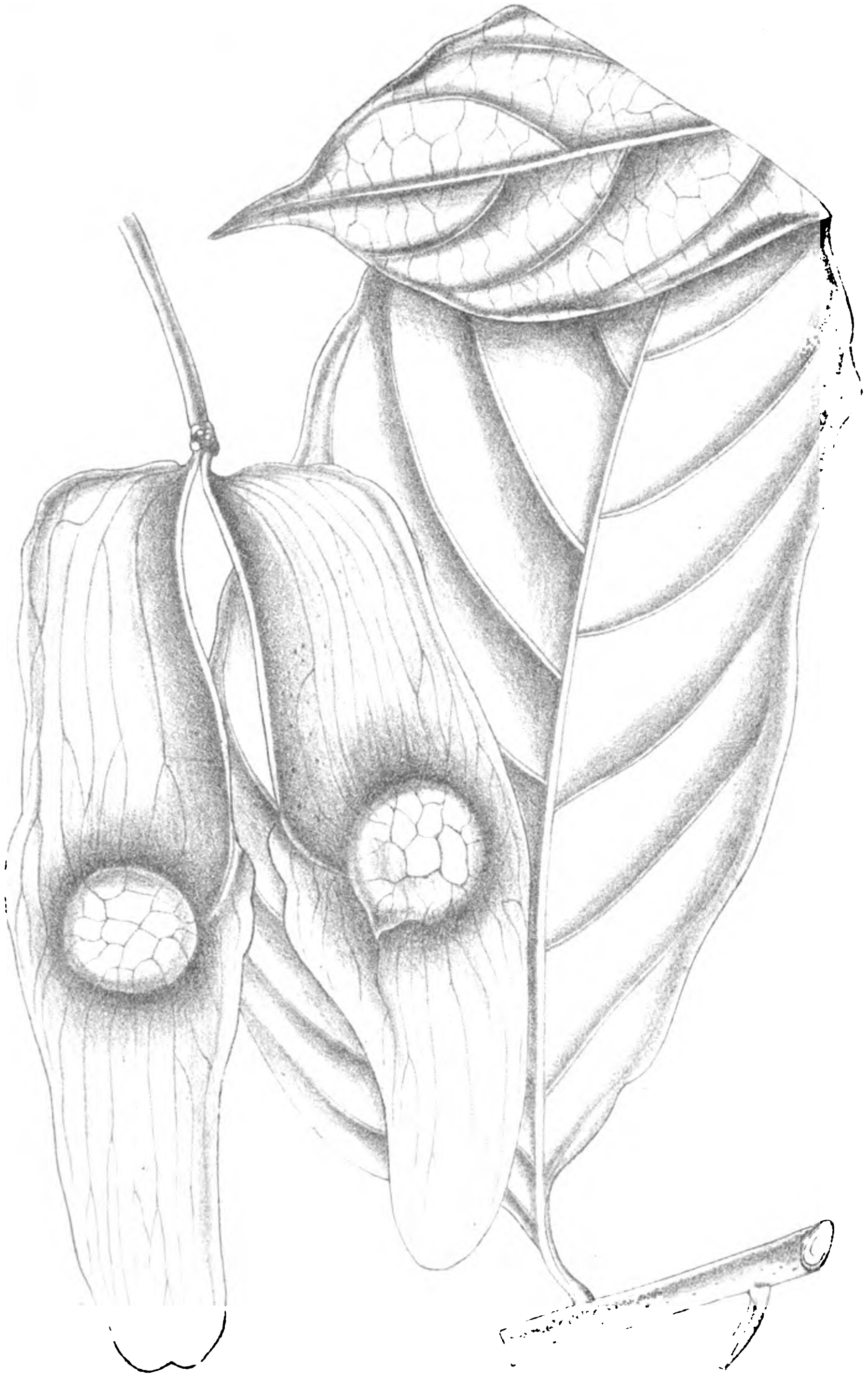


D. N. Chaudhari delt. K. P. Dass lith.

AILANTHUS GRANDIS Prain.

[*Reprinted from the Indian Forester*, xxviii, *No.* 4, *for April* 1902.]

An undescribed Ailanthus from North-Eastern India.

By D. Prain.

When examining the material of the genus *Dalbergia* at Kew in 1899, the writer found, at the end of the genus, a single undetermined fruit, with which is associated two notes in the handwriting of General Jenkins, at one time Agent for the Governor-General on the North-Eastern Frontier, who was untiring in his efforts to investigate the Natural History and exploit the resources of Assam. All that the writer could say regarding the fruit was, that it is not the pod of a *Dalbergia.*

More definite information was soon available; for, in 1900, Mr. Cave, of the Bengal Cinchona Department, sent to Calcutta a specimen, in leaf and fruit, of the very tree that had been once met with, half a century earlier, in Assam. Flowers unfortunately we have not yet been able to get, but the leaves and the fruit show that it is unmistakeably an *Ailanthus*, and a comparison of our specimen with the *Ailanthus* material at Kew and at Calcutta indicates that it is a species hitherto unreported from India, Indo-China or Malaya. With the object of attracting the attention of Forest officers and others in Sikkim and Assam to what is evidently a fine tree, a description of the species, as complete as the material yet available will permit, is here given. Three plates are added; one shows a leaflet and the fruit of this new species, the others, for purposes of comparison, show leaflets and fruits of the other species to be met with in India.

Ailanthus grandis *sp. nov.;* arbor elata, *foliis* compositis, foliolis alternis utrinque glaberrimis basi obliquis margine integris, *samaris* majusculis, stramineis, oblongis utrinque obtusis, basi rectis.

Assam: Rungagora, *Jenkins.* Sikkim: Ryang, *Cave.* A lofty tree, reaching 120 feet in height. *Leaves* alternate, 60—100 cm. long; leaflets alternate, oblique, ovate-lanceolate with shortly acuminate apex and obliquely cuneate base, 16—20 cm. long and 8 cm. wide, glabrous on both surfaces, with 10—12 pairs of secondary nerves, their margins entire. *Panicles* large, their branches 15—16 cm. long; pedicels in fruit 4 cm. long. *Flowers* unknown.

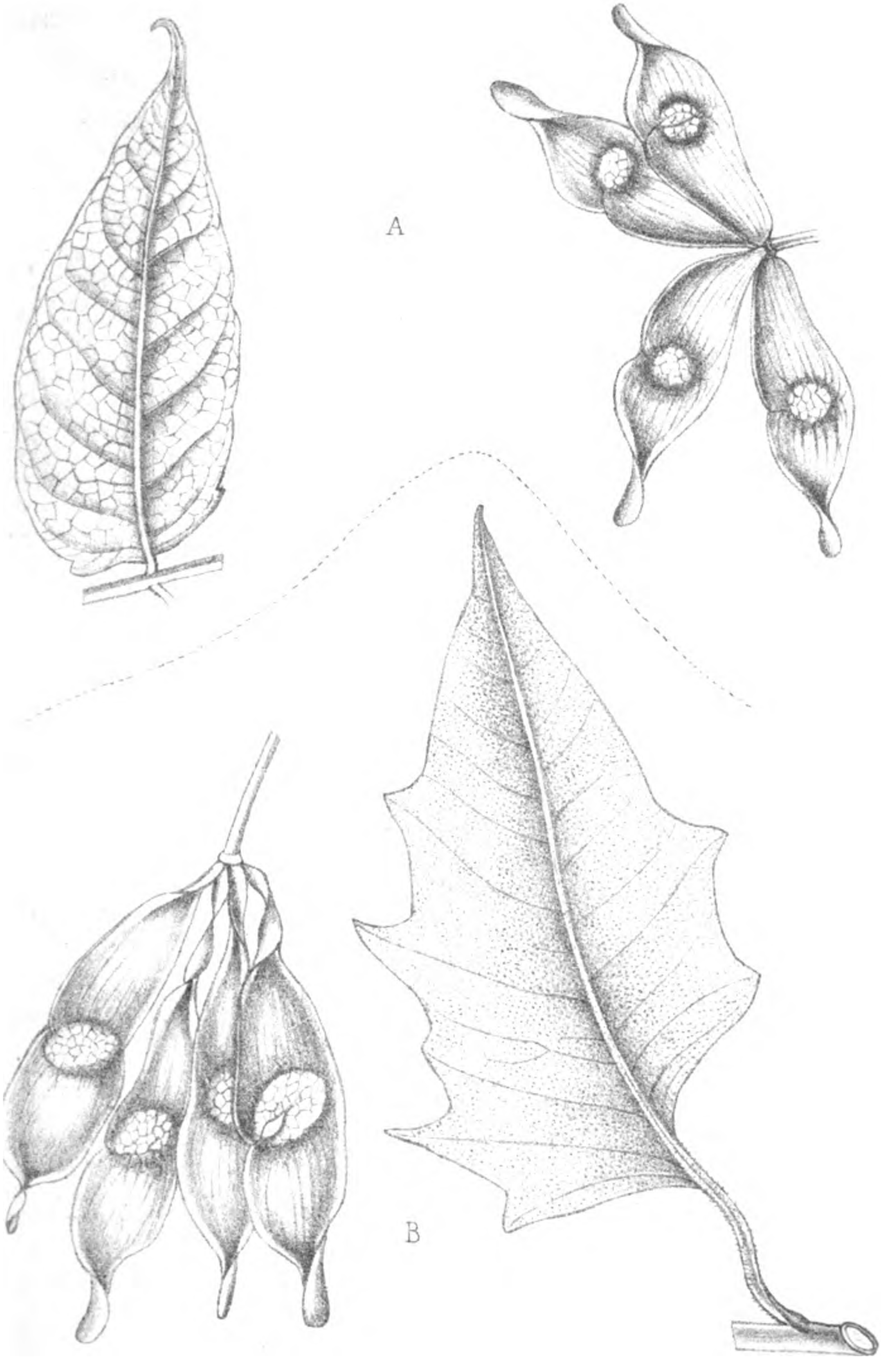
Samaras 2-3, with rounded obtuse apex and base rounded to outer straight on inner margin; length 11—13 cm., width, 3·5 cm. *Seed* near middle of samara, 1·5 cm. across.

The Assamese name is given as *Actaluca;* no vernacular name has been reported from Sikkim.

General Jenkins' first note is: "No. 45. Actaluca. The "seeds of an unknown tree in and about Rungagora; one of the "most noble of forest trees. The one from which the seed is "taken is so high that we cannot get at the leaves, the nearest "branch being perhaps 80 feet high. I hope one or two of the "seeds may vegetate." This note was not improbably addressed to Dr. Wallich, then Superintendent of the Calcutta Botanic Garden. Apparently none of the seeds did germinate; this was unfortunately our experience with those from the Ryang in 1900. The second note, written a year later, is: "The tree has been mea-"sured by Masters and he makes it exactly 120 feet high, but the "natives say it is only a very small one of its kind." The Masters referred to in this note is Mr. J. W. Masters, then a Deputy Commissioner in Assam, well known for the extent and the excellence of the collections and notes made by him in that province between 1835 and 1845. Rungagora, the old capital of the Máták country, according to Griffith is, or was, situated one march east of Dibrugarh.

The other species of *Ailanthus* to be met with in India are:— *A. glandulosa*, a native of China, but now met with in Europe, North America, and Northern India as a planted tree; *A. excelsa*, a well-known Indian tree, found wild throughout South India and Central India, and extending as far north as Chutia Nagpur on the east, and Rajputana on the west, but occasionally planted also in Northern India and Bengal; finally *A. malabarica*, found in Western India between the Ghauts and the coast from the Concan and Kanara to Calicut and Travancore, as well as in Ceylon.

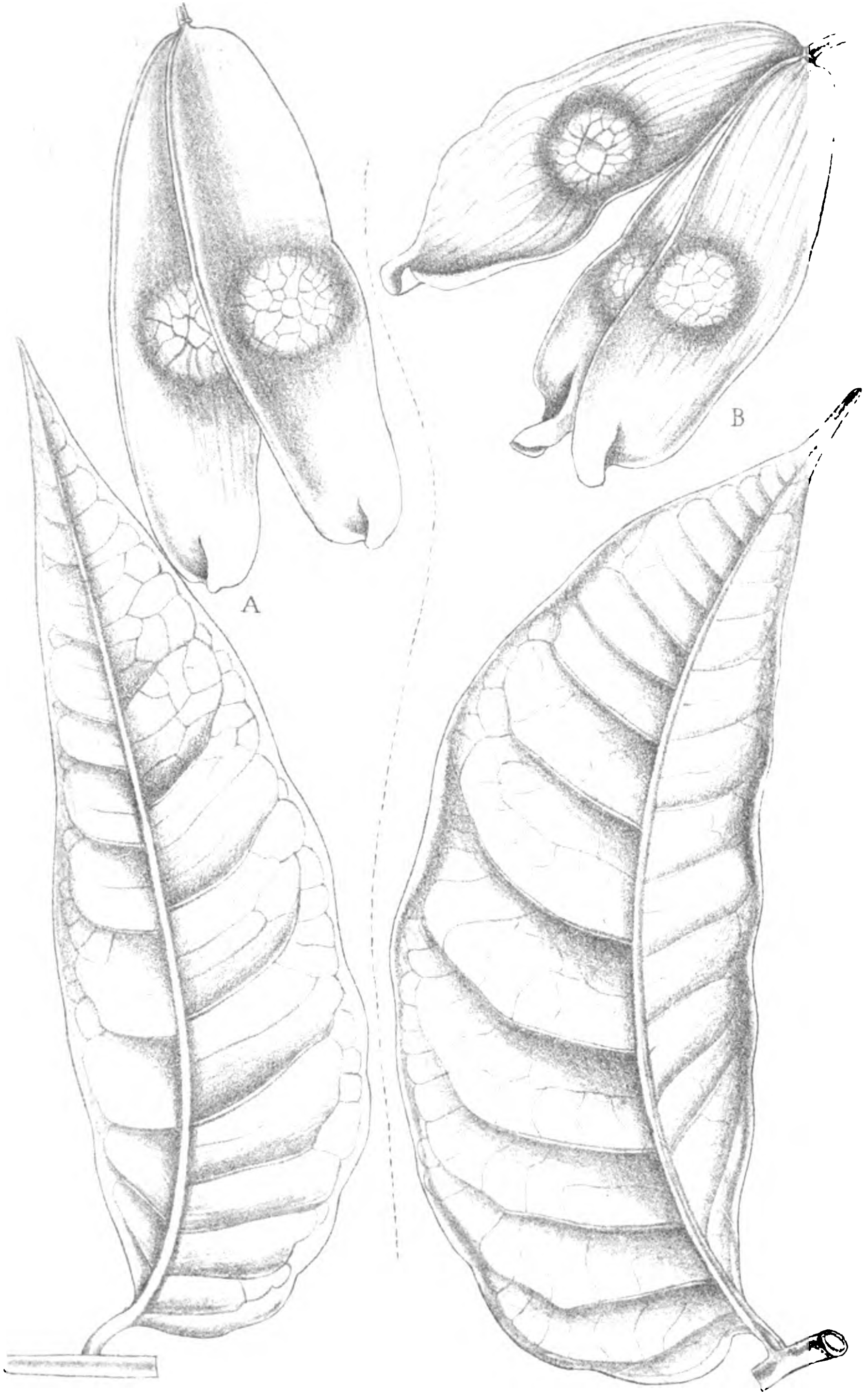
A. malabarica is also said to occur in Cochin-China; but this is not admitted by Pierre, who describes two Cambodian trees, *A. Fauveliana* and *A. calycina*. Of these *A. Fauveliana* is evidently nearly related to *A. malabarica*, and may be the Cochin-Chinese species mistaken for *A. malabarica*. The excellent figures and careful description of Pierre leave, however, little doubt that this is a distinct species. *A. calycina* has a calyx very unlike that of *A. malabarica*, and is undoubtedly a different tree. In Pegu, Kurz found in the Khaboung valley on the eastern slope of the Yomah, the fruits of an *Ailanthus* which he identified with *A. malabarica*. No one has found this, or any other, *Ailanthus* in Pegu since, but numerous examples have been sent to Calcutta of a species that is apparently common in S. Andaman, the samaras of which are exactly like those of the Pegu tree. They differ markedly from the samaras of *A. malabarica* in being more distinctly veined and in being glossy instead of dull. Their tips are also decidedly



N. Needham delt.

A. N. Banerji lith.

A. AILANTHUS GLANDULOSA Desf. B. A. EXCELSA Roxb.



D. N. Chaudhari delt.

K. P. Dass lith.

A. AILANTHUS MALABARICA DC; B. A. KURZII Prain.

more twisted than those of *A. malabarica*, but this character, it is to be feared, cannot be greatly depended on in herbarium specimens. The flowers, however, differ considerably from those of *A. malabarica*, as there is usually present in the males a rudimentary ovary with a slender style almost as long as the filaments. In the flowers of *A. malabarica* and *A. imberbiflora* examined by the writer the males have either no ovary at all, or if a rudimentary ovary be present there is no long slender style. This appears to be the case also in the nearly allied *A. Fauveliana*, and in another tree from Java described by Koorders and Valeton as *A. malabarica* var. *mollis*. The Pegu-Andaman tree the writer is therefore inclined to consider a distinct species to be known as *A. Kurzii.* There is, however, possibly another Indo-Chinese *Ailanthus*. After having seen the solitary samara of *A. grandis* at Kew in 1899, the writer showed a drawing he had made of it to the late Mr. Franchet, and discussed with him the possible affinities of the tree that had yielded it. That learned botanist was able at once to refer to some very similar fruits in the collection of Mr. Drake del Castillo, where also they had been tentatively referred to *Dalbergia*. These fruits were picked up by Balansa under a great tree in Tonkin, of which *A.* could not obtain leaves. They more resemble the samaras of he *grandis* than they do those of any other species, but though larger than those of *A. malabarica* and its allies, are smaller than those of *A. grandis*. They may prove to be the fruits of *A. calycina*, the samaras of which are still unknown, but they may equally possibly belong to still another undescribed species.

In Malaya two species are met with. One is the tree from Java already alluded to, which has been referred by Koorders and Valeton to *A. malabarica*. The only fruiting specimen of this that the writer has seen has the samaras unfortunately not yet full grown. They resemble, however, much more the samaras of the Andamanese *A. Kurzii* at the same stage than they do the corresponding samaras of *A. malabarica*. From *A. Kurzii*, however, the Java tree is, by its flowers, certainly distinct, and if an opinion can be formed from a careful examination of two specimens, the Java *Ailanthus* is still another species which may be known as *A. mollis*. It belongs undoubtedly to the same group as *A. malabarica:* within that group its nearest ally is, however, not *A. malabarica* or *A. Kurzii*, but *A. Fauveliana*. The other Malayan *Ailanthus* is *A. moluccana*, one of the earliest species reported, but even now one of the least adequately known. Finally there is in N. Australia still another species, *A. imberbiflora*. It has been suggested that this Australian tree is a variety of our Indian *A. excelsa;* it is, however, more nearly related to *A. malabarica* than to *A. excelsa*, but is easily distinguishable even from *A. malabarica*.

The geographical distribution of the genus is thus very interesting. Except *A. glandulosa*, which is the type of a distinct section and is Chinese, all the species are confined to the botanical region of S.-E. Asia—India, Indo-China, and Malaya, with the adjacent territory of N. Australia. But while the genus as a whole is very wide spread in this region, the various forms that comprise it are remarkably localised. The Malabar country—S. Ceylon, Travancore, Malabar, and the Concan—has *A. malabarica* limited to this region. India proper has *A. excelsa*, found everywhere throughout the peninsula, but neither passing beyond the Ghauts to the west nor beyond the Gangetic plain to the north. *A. grandis* occurs at the foot of the Eastern Himalaya in Sikkim and Upper Assam. In Indo-China we have similarly *A. Kurzii* confined to Pegu and the Andamans, and *A. Fauveliana* confined to Cambodia. The species met with in Tonkin may also be a distinct one, or may possibly be the same as *A. calycina*, which is also a Cambodian form. In Western Malaya we have *A. mollis;* in Eastern Malaya, *A. moluccana;* and in N. Australia *A. imberbiflora*. The absence of the genus from the Philippines and New Guinea, so far as we yet know, does not preclude its presence entirely. It would be no matter for surprise were species to be reported from both localities when their vegetation becomes more adequately known.

Of the three plates here given, Plate I represents a leaflet and fruit of *A. grandis;* Plate II, leaflets and fruits of *A. glandulosa* and *A. excelsa;* and Plate III, leaflets and fruits of *A. malabarica* and *A. Kurzii;* the fruits and leaflets are, in each case, of natural size; the leaflet selected is, in every instance, the third leaflet, counted from below, of a full-sized leaf. It is found that there is some variability in the size of the two lowest leaflets in leaves of the same specimen; this variability does not affect the third leaflet, hence the selection.

[*Reprinted from the Indian Forester*, xxviii, *No.* 6, *for June* 1902.]

Ailanthus Grandis.

By D. Prain.

The opportunity has been taken, during an inspection visit to the Cinchona Plantation in Sikkim, to search personally for the tree described in the *Indian Forester* for April as *Ailanthus grandis.*[*] It was not difficult to find; it is not uncommon along the Ryang and Rungjo streams, and my Lepcha collectors tell me it is equally frequent along other streams that join the Testa.

The Lepcha name for the tree is *Malditkung*, a name that, in Mr. Gamble's excellent "Darjeeling List," connotes *Garuga pinnata.* As there is said to be but one *Malditkung*, it seems as if some mistake had been made by Mr. Gamble's native attendant; the Paharia name, *Dabdabbi*, given by Mr. Gamble for *Garuga*, is said by my men to be correct. The Paharia name for the *Ailanthus* is *Gogul*, a name not to be confounded with *Goguldhup*, which in Mr. Gamble's List connotes *Canarium sikkimense.* The last connotation has been verified in connection with the present enquiry.

The use of the term *Gogul* for two distinct trees is explained, so my native informants say, by the fact that the two are very usually found together, and that they are of similar habit; they run up, as *Gurjans* do, with a clean straight stem of 80—90 feet before giving off any branches. One of my native companions, indeed, in referring to the *Ailanthus*, used the significant expression *dusera gogul.* The epithet *dhup*, applied in the case of the *Canarium*, is given because the *Canarium* yields a resin that can be used as incense; the *Ailanthus* yields no resin.

This *Ailanthus* attains a total height of 120—150 feet and so shares with *Canarium sikkimense* and *Tetrameles nudiflora* the reputation of being one of the tallest trees in Sikkim. As regards girth, however, it far surpasses the *Canarium*, equalling *Maina-kat* (*Tetrameles nudiflora*) without being buttressed as that tree is. My Lepchas say, indeed, that in the matter of girth it even rivals *Panisaj* (*Terminalia myriocarpa*), usually considered the giant of the Sikkim forests, while reaching a greater height than *Panisaj* ever attains. The measurements so far obtained for *Ailanthus* are, however, far from as great as some of those quoted for *Terminalia myriocarpa*, the largest at 6 feet from the ground being only 9·5—12 feet.

There is little to add to the description already given. The bark, which is rather thin, is smooth and pale whitish grey, very like the bark of *Ailanthus excelsa* as grown in the Royal Botanic Garden at Calcutta. The leaves are 5—8-jugate, usually 7-jugate, even-pinnate, the leaflets, except the terminal pair, being as a rule only sub-opposite, or, especially towards the base of a leaf, quite alternate. The leaves are exceedingly like those of a *Dysoxylum* or of a *Chisocheton* and, in the absence of fruits, might be readily supposed to belong to a Meliaceous tree. This fact, coupled with the transfer of its Lepcha name to *Garuga* and the circumstance that it bears the same Paharia name as another tree, probably explains how *Ailanthus grandis* has been so long overlooked.

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[*] Page 131.

Some of the trees are now (commencement of April) in ripe fruit, and from the circumstance that, among examples of the same size and growing under precisely similar conditions, certain individuals are loaded with samaras while others have none, it is to be suspected that the species may be, at least functionally, diœcious. This point, however, can only be settled when, later in the season, flowers are obtained.

The figure of the samaras given in the *Forester* for April was taken from a specimen glued down on a herbarium sheet, and shows them as quite flat. On the trees, however, and when they fall, though a few are quite flat, the majority have precisely the apical spiral twist shown in the figured samaras of *A. glandulosa* and *A. excelsa.* This fact tends to confirm the suspicion, already expressed, as to the inadequacy of the character when dealing with herbarium specimens of *A. malabarica* and *A. Kurzii*, or for that matter of any of the other species. Though the existence of an apical twist is not recorded for these, it is by no means impossible that the samaras of all of the species of *Ailanthus* are thus twisted, and that the character is a generic, not a specific, one.

No use is said to be made of the timber of *Ailanthus grandis*, another circumstance that helps to explain its existence having been overlooked.

Government Cinchona Plantation,
British Sikkim,
10*th April* 1902.

NOTES ON INDIGOFERA.

[*Reprinted from the* 'JOURNAL OF BOTANY' *for Feb. and April*, 1902.]

[*Reprinted from the* 'Journal of Botany' *for Feb.*, 1902.]

NOTES ON INDIGOFERA.

By David Prain, F.L.S., and Edmund Baker, F.L.S.

The following notes have been made during the course of an examination of some of the types of the older species of *Indigofera*. The primary object of this examination was the elucidation of the synonymy, &c., of the "Indigo-yielding species," but notes on some of the other species are also included.

I. Identification of Old Material.

Prior to the publication of Linnæus's *Species Plantarum* in 1753 we have figures of plants of this genus in various botanical works. It is, perhaps, only necessary to refer here to the figures of four of these early authors; references to others will be met with under the species they delineate.

Rheede, in his *Hortus Malabaricus*, 1678-1703, vol. i. tab. 54, figures a plant which Linnæus quotes in his synonymy of *I. tinctoria*, and which De Candolle, in the *Prodromus*, ii. p. 224, places under his var. *α macrocarpa;* it is the South Indian plant which is named *I. tinctoria* in the Linnean herbarium. Vol. ix. tab. 30, shows the plant we now know as *I. hirsuta* L. Rheede's tab. 67 in the same volume is stated in the *Flora Zeylanica* to be a bad figure of the plant that we now know as *I. glabra;* in our opinion it is not an *Indigofera*. Rheede's remaining plates will be found quoted under their respective species in Hooker's *Flora of British India*, vol. ii. pp. 92–102.

Plukenet, in his *Phytographia* (1691), figures several species. The types of these are preserved in the Sloanean Herbarium in the National Collection, and it may be well to give an enumeration of them, together with our identifications.

Tab. 101, fig. 6. Nil seu Anil sylvestre Cynanchicæ foliis Bisnagarica. Herb. Sloane, vol. 93, f. 224; see also vol. 242, f. 84. = *I. aspalathoides* L.

Tab. 165, fig. 5. Colutea siliquosa Maderaspatana ad nodos caulium siliquis bigemellis. Herb. Sloane, vol. 95, f. 186.

Burman (Fl. Indica, p. 170 (1768)) considers this var. *β* of *I. tinctoria*, but it is only one of the usual states of the South Indian form of this species.

Tab. 165, fig. 4. Colutea minima species disperma ex India Orientali (= *Hedysarum prostratum* fide Giseke Index Pluken. p. 8, 1779). Herb. Sloane, vol. 95, f. 186. = *I. enneaphylla* L.

Tab. 166, fig. 1. Coluta siliquosa glabra ternis quinisve foliis Maderaspatana semine rubello. Herb. Sloane, vol. 95, f. 186. = *I. glabra* L.

Tab. 166, fig. 2. Colutea enneaphylla Lotoides Ind. Orientalis siliculis conglomeratis (= *Psoralea pinnata* Giseke, *l. c.*, non L.). Herb. Sloane, vol. 95, f. 186. = *I. enneaphylla* L.

Tab. 166, fig. 3. Colutea siliquosa enneaphylla Ind. Orient. siliquis foliis aversa parte pubescentibus. Herb. Sloane, vol. 95, f. 185. = *I. viscosa* L.

Tab. 185, fig. 5. Genista capensis spinosa Ligustrifolio pentaphyllo floribus spicatis rubris. Herb. Sloane, vol. 96, f. 50. = *I. cytisoides* L. quoted for this plant in Willd. Sp. Pl. iii. p. 1232, 1800.

Tab. 320, fig. 3. Trifolium æthiopicum ex alis, &c. = *I. psoraloides* L. quoted for this plant in Willd. Sp. Pl. iii. p. 1223, 1800.

Sloane (Nat. Hist. Jamaica, tab. 179, fig. 2, & tab. 176, fig. 3) figures two plants, and specimens of both of these are preserved in his herbarium. The first is placed by De Candolle among the synonyms of *I. tinctoria* L. var. *macrocarpa* DC.; it is the form equivalent to *I. Sumatrana* Gaertn. (*I. indica* Lamk.). The second is practically the type of *I. Anil* L. var. *oligophylla* DC., which is the same as *I. truxillensis* H. B. K.

Rumphius (Herb. Amboinense, tab. 80) figures a plant which De Candolle doubtfully attributes to *I. tinctoria* L. var. *macrocarpa* DC., and also to *I. Anil* L. var. *orthocarpa* DC. We consider the figure to be that form of *I. Anil* variously distinguished as *I. Anil* L. var. *olygosperma* Miquel, and *I. Anil* L. var. *asperma* Zoll., the form assumed by *I. Anil* when grown as a perennial, and when propagated by cuttings and offsets instead of by sowing.

Linnæus in his *Flora Zeylanica* occasionally quotes Petiver, and it may be well to enumerate the species of *Indigofera* to be found in his works. Petiver was contemporary with Plukenet, and his herbarium is also preserved in the National Collection. The types of many of the plants mentioned in his "Catalogus Plantarum" at the end of Ray's *Historia Plantarum* are in this collection, as are also the types of plants in the "Musei Petiveriani Centuriæ," 1695-1703, and of plants mentioned in his papers to the *Philosophical Transactions* between the years 1697 and 1717. Among them are the following species of *Indigofera*, and, as Petiver died in 1718, they form interesting early records for this genus:—

"45. Colutea lannuginosa floribus parvis siliquis pilosis deorsum tendentibus an Kani tageri H. Mal. v. 9, tab. 30, p. 55? Scorpion Sena with pendulous hairy podds. It grows about Cape-Coast plentifully. I have also seen it from the East-Indies." Mus. Pet. Cent. i. p. 9, 1695. Herb. Sloane, vol. 161, f. 83, & vol. 289, f. 22. = *I. hirsuta* L. This synonym was quoted by Linnæus in Fl. Zeylanica under this species.

"357. Astragalus Madrasp. Tragacanthæ foliis." Mus. Pet. Cent. iv. & v. p. 37. Herb. Sloane, vol. 161, f. 76. Also among Plukenet's plants, Herb. Sloane, vol. 104, f. 33. = *I. Wightii* R. Graham.

"59. Colutea Madraspat. siliquosa, flo. nudo spicato." Cat. Pl. Ray Hist. Pl. iii. App. p. 243. Herb. Sloane, vol. 161, f. 82. = *I. pulchella* Roxb.

"60. Anil Madraspat. trifoliata." Cat. Pl. *l. c.* Herb. Sloane, vol. 161, p. 106. = *I. trifoliata* L.

"61. Anil Madraspat. Viciæ foliis incanis caulibus pubescentibus." Cat. Pl. *l. c.* Herb. Sloane, vol. 161, f. 71. = *I. glabra* L.

"10. Shearanar weamboo Malab. Anil Madraspatana foliis minimis confertis." Philosophical Transactions, No. 244, p. 318.

(1698). Herb. Sloane, vol. 161, f. 51, & vol. 276, f. 7. = *I. aspalathoides* L.

"35. Caut Morunga Malab., or Wild Bezoar Tree. Anil Madraspatana trifoliata, siliquis carinatis hirtis." Phil. Trans. No. 244, p. 330 (1698). Herb. Sloane, vol. 161, f. 106, & vol. 274, f. 20. = *I. trita* L.

"57. The True Indigo." Phil. Trans. No. 266, p. 703 (1700). Herb. Sloane, vol. 332, p. 61.

I. tinctoria L., the true or Madras form of the species. Gathered by Samuel Brown, April, 1696, near Pearmeedoor, about sixteen or seventeen miles from Fort St. George; this is also the locality for the other plants mentioned here which were described by Petiver in Phil. Trans.

"70. Codeseru-paulado Malab. Anil Pearmeedoorica Coluteæ foliis pubescentibus fere pentaphyllis." Phil. Trans. 1700, p. 708. Herb. Sloane, vol. 276, f. 6. = *I. glabra* L.

"81. Chetamucan Malab. Anil Pearmeedooricum trifoliatum, glaucum, siliquis rigidis." Phil. Trans. 1700, f. 714.

I. trita L., but on the same sheet there is a specimen of *I. oblongifolia* Forsk. (*I. paucifolia* Del.). Herb. Sloane, vol. 161, f. 105.

In Herb. Sloane, vol. 274, f. 20, there is another label No. 81 with only a specimen of *I. oblongifolia* Forsk. This fact, coupled with the fact that Petiver has already disposed of *I. trita* under No. 35, leads us to suspect that No. 81 is intended to refer only to *I. oblongifolia.* Local botanists will, however, probably be able to settle the point with the assistance of Petiver's vernacular names.

Other early specimens of *Indigofera* preserved in the Sloane Herbarium are:—

Colutea Indica Galegæ folio & siliqua, floribus purpureis ex Insulâ Johannâ: Pluk. Mantissa, p. 52 (1700); Ray Hist. Suppl., p. 452 (1706); Herb. Sloane, vol. 102, f. 169. Supposed to have been collected by Dr. Adair on these islands, and sent to Dr. Plukenet. = *I. endecaphylla* Jacq.

"Colutea anilifera ex Coromandel." Herb. Sloane, vol. 102, 170. Amongst Plukenet's plants.

"Colutea anilifera Ind. Or. Erymurry." Herb. Sloane, vol. 93, f. 109. = *I. tinctoria* L., the true or Madras form of this species.

"Wild Indigo cald Guatimala Jam: H. B." Herb. Sloane, vol. 184, f. 8. = *I. Anil* L.

The species that follow are arranged according to the sequence of the dates of their publication. The three species of Indigo named by Linnæus in the first edition of his *Species Plantarum* are the same as in his earlier *Flora Zeylanica* (1748), which was founded on the collections of P. Hermann; specimens of all three exist in Hermann's herbarium.

In the *Species Plantarum*, 1753, we have, therefore:—*I. tinctoria* = the Madras form of this plant, but, as his herbarium shows, with the plant subsequently distinguished as *I. Anil* included; *I. hirsuta* and *I. glabra.* Additional in *Species Plantarum*, ed. 2, 1763, we have *I. racemosa* and *I. trifoliata.* Additional in *Syst. Nat.* iii. Appendix, p. 232, 1768, we have *I. disperma.*

Burmann, in his *Flora Indica*, 1768, p. 170 *et seq.*, has the following:—

I. tinctoria, the same as the Ceylonese and Indian portion of *I. tinctoria* L.

I. hirsuta, also that of Linnæus.

I. glabra, also that of Linnæus.

I. trifoliata, also that of Linnæus.

I. argentea, a good species, and altogether distinct from the species named *I. argentea* by Linnæus in 1771.

Miller, in his *Dictionary*, ed. viii. 1768, has the following:—

I. tinctoria; this, as an authentic example from Herb. Miller shows, is not the Linnean *I. tinctoria;* it is not, as a matter of fact, any form of *I. tinctoria*, but is the cultivated state of *I. Anil β polyphylla* DC., *i.e.*, the true *I. Anil* of Linnæus.

I. suffruticosa; this, as the authentic example shows, is the same as the "Guatimala Indigo" of Browne and Lunan, and therefore only the wild state of the foregoing.

I. caroliniana, in all likelihood the same as the plant later termed *I. caroliniana* by Walters, and therefore = *I. disperma* L. There is a specimen of *I. disperma* in Herb. Miller, but it is not named *I. caroliniana.*

I. indica = *I. hirsuta* L., and not the later *I. indica* of Lamarck.

I. glabra, the same as that of Linnæus.

In Linnæus, *Mantissa*, pp. 272–273, 1771, are the following; some of them are only in a note:—

I. sericea (now referred to *Amphithalia*); *I. trifoliata*, as in Sp. Pl. ed. ii.; *I. psoraloides; I. procumbens; I. cytisoides; I. argentea*, a very different plant from the *I. argentea* of Burmann; it was not named *I. argentea*, but *I. tomentosa*, by Linnæus in his own herbarium; *I. hirsuta*, as in Sp. Pl. ed. i.; *I. enneaphylla; I. angustifolia; I. Anil*, a species founded on a specimen included till this time by Linnæus under *I. tinctoria*, the specimen in question shows that Linnæus's *I. Anil* is exactly the plant previously characterized by Miller as *I. suffruticosa*, and subsequently named by De Candolle *I. Anil* var. *β polyphylla; I. tinctoria*, now limited by Linnæus, as in his *Flora Zeylanica* of 1748 and as in Burmann's *Flora Indica* of 1768, to the Madras form of *I. tinctoria; I. disperma*, as in Syst. Nat. iii. Append.; *I. glabra* as in Sp. Pl. ed. i.

II. NOTES ON INDIVIDUAL SPECIES.

I. TINCTORIA L. Sp. Pl. p. 751 (1753). The original description is as follows:—

"Indigofera [tinctoria] leguminibus arcuatis incanis, racemis folio brevioribus. Fl. Zeyl. 273. Amoen. Acad. i. p. 408. Hort. Ups. 208. Mat. Med. 348.

"Indigofera foliis nudis. Hort. Cliff. 487.

"Anil f. nil inodorum color. Bauh. Hist. ii. p. 945.

"Ameri, Rheed. Mal. i. p. 101, t. 54.

"Habitat in India."

As we have previously stated, there is a specimen in Herb. Hermann which is the Madras form of *I. tinctoria* as we now understand that species.

Ameri Rheede Mal. *l. c.* is *I. tinctoria α macrocarpa* DC. There are two specimens of *I. tinctoria* in Linnæus's herbarium. There is a third sheet, at first named by him *I. tinctoria*, afterwards altered by himself to *I. Anil*. The two left as *I. tinctoria* are the Madras form of *α macrocarpa* DC. The third sheet is *I. Anil* L. *β polyphylla*.

I. TINCTORIA *α* MACROCARPA DC. Prod. ii. p. 224 (1825). "Leguminibus elongatis 8–10 spermis. Verosimil ex India orient orta. Sloane, Jam. 2, t. 179, f. 2. Rheed. Mal. *l. c.* t. 54. Rumph. Amb. 5. t. 80? *I. Sumatrana* Gaertn. Fruct. 2, p. 317, t. 148. Lam. Ill. t. 626, f. 1. An ab hac satis differt *I. cœrulea* Roxb. Cat. Calc. 57 (v. s. specimen ex India et Senegal)."

Under the above name, as far as citations go, are thus included both the fairly distinctive cultivated forms of *I. tinctoria*, the southern or Madras form with pods longer and more slender, and also as a rule fewer in number than the northern or Bengal form.

So far as specimens go, however, an examination of the Prodromus Herbarium obligingly permitted by M. C. de Candolle, who, with M. A. de Candolle, has most kindly helped one of us in the examination, shows that *α macrocarpa* includes (1) a specimen of the cultivated form of *I. suffruticosa* (i.e., *I. Anil β polyphylla* DC.) marked "Coronilla? Senegal, Sparmann"; (2) a specimen of the wild form of *I. suffruticosa*, marked "Envoi de Demerara, M. Parker"; (3) a specimen of *I. cœrulea* Roxb., *i.e.*, of the eastern form of *I. articulata* Gouan; and (4) a specimen of *I. tinctoria* Herb. Vahl, from Guinea, collected by Thonning and presented by Sonder. This is the northern or Bengal form of *I. tinctoria*, and is the only specimen of *I. tinctoria* present in the Prodromus cover of *I. tinctoria α macrocarpa*.

It may be as well in this place to state what in our opinion the forms of *I. tinctoria* are. There are three of them:—

1. The wild form, apparently unknown to Linnæus or De Candolle. This is the plant first discovered by Kotschy, and characterized as *I. Anil* L. var. *orthocarpa* by Schimper in sched. in Kotschy, Iter Nubicum, nn. 268, 331 (1841). It is not De Candolle's *I. Anil γ orthocarpa* Prodr. ii. 225. Berg, who thought it to be De Candolle's variety of this name, recognized in it a distinct species, the synonymy of which is as follows:—

I. orthocarpa Berg in Berg & Schmidt, *Darstell. u. Beschr. officin. Gew.* iv. xxx. (1863); Baker in *Flora of Tropical Africa*, ii. p. 99 (1871), non Presl. *I. Bergii* Vatke in *Appendix ad Ind. Sem. Hort. Berol.* 1876, p. 3.

This form has frequently been collected in Africa; it is interesting to find that the African Continent, and not, as has usually been supposed, some portion of South-eastern Asia, is probably the original home of *I. tinctoria*. This form, though exceedingly rare in India, is not there wholly unknown; specimens agreeing with the African plant have been collected in Central India.

2. The Southern, or Madras and Ceylon cultivated form, which constitutes the plant dealt with by Linnæus in his *Flora Zeylanica*, by Burmann in his *Flora Indica*, and, with the exception of the

specimen of *I. Anil* originally referred by Linnæus to *I. tinctoria*, is the *I. tinctoria* of the *Species Plantarum*. It was apparently from early times cultivated in Southern India and throughout the Malayan region. Apparently it is now largely cultivated only in the Madras Presidency; it is there looked upon as something quite distinct from the Indigo-plant of Northern India, so much so, that it generally goes by the name of *I. Anil* among those who think themselves well-informed. It has, of course, nothing to do with *I. Anil*, which, though at one time largely grown in Burma and Malaya, never has found favour among cultivators in any part of the Indian Peninsula. This was, and still is, the *I. tinctoria* of cultivators in the Dutch Indies, where, however, the species is not now much favoured. Specimens of this form, evidently feral after escape, have been communicated from many places both within and beyond the limits of the area where it now is, or formerly has been, in cultivation. It is not necessary to mention all of these; some of the more outlying ones are, however, of interest, such as the Philippines; Northern Queensland (Endeavour River), where, from what Baron Mueller says, it would seem to have been taken by some agency other than human; the Laccadives, where in the Island of Kadamum it has been found by Hume and by Alcock forming thickets that cover a great portion of the island; finally, Merwara, in Rajputana, where it is not, and probably never has been, cultivated. In Rajputana, the plant grown as Indigo, and, termed "Nil" by the inhabitants, is a form of the "Nil" of Egypt and Arabia, *I. articulata* Gouan (*I. argentea* L., non Burm.; *I. cærulea* Roxb.), and is quite distinct from the "Nil" of Northern India; the name given to the Madras form of *I. tinctoria* which grows in Merwara as a quite wild plant along the sides of ravines is "Jinjini," and the only use made of the plant is that its seeds are collected and eaten in years of scarcity and famine. This is one of the two forms of *I. tinctoria* included by De Candolle under his var. α *macrocarpa* of that species; that other form is

3. The Northern cultivated form, largely in use in Northern India from the Behar and Tirhut westward to the Panjab, where its area meets that in which some form of *I. argentea* is grown, and southward to the Circars, where its area meets that in which the Madras form of *I. tinctoria* is grown. This, throughout the area specified, is the plant known as "Nil," and is the form to which the name *I. tinctoria* is applied. As has been shown, it is not exactly what Linnæus meant by *I. tinctoria;* it is, however, precisely what Gaertner intended by *I. sumatrana*, and what Lamarck has figured as *I. indica* (not the same thing as the older *I. indica* of Miller, which is *I. hirsuta* L.). In the Dutch, as in the English, Indies these two forms have been usually treated as distinct, a treatment all the more natural that in Malaya the two seem to have been grown alongside of each other and of *I. Anil*, whereas in India the two have at all periods been restricted to fairly well-defined areas, and to have been grown within these areas practically exclusively. About sixty years ago, the names "*sumatrana*" and

"*indica*" appear to have fallen into disuse in Java, and the name *I. leptostachya*, given to this form by Zollinger under the mistaken idea that this is the plant to which De Candolle applied the name *I. leptostachya*, came to be used for it. This name, *I. leptostachya*, is still in use in Java, but is no longer applied to this form of *I. tinctoria*; it connotes now an African species, *I. arrecta* Hochst., equally remote from the Candollean plant to which the name was originally given. The northern form of *I. tinctoria* extends to Formosa; it is also the form of *I. tinctoria* that was first introduced to the West Indies from the East Indies; and is the form of *I. tinctoria* figured by Sloane, t. 179, fig. 2. This makes it also the *I. tinctoria* of Lunan, Hort. Jamaicensis, in so far as that is based on Sloane's figure. The specimen from which Sloane's figure was drawn has glued down on the same page fruits of *I. Anil*, but these have not been used in drawing the figure.

If, however, the view expressed by Berg, Baker, and Vatke, that the sylvestran form of this species deserves to be recognized as a species under the name *I. Bergii* Vatke—and we are bound to admit that, apart altogether from the high authority of the writers who have given expression to the view, there is a good deal to be said for it on morphological grounds—it will become necessary to accept the view of Gaertner, Lamarck, and Zollinger, that the form cultivated in Northern India is a species apart from *I. tinctoria* L., to be known as *I. sumatrana* Gaertner. The differences between these two cultivated plants are as salient and as constant as the differences between *I. Bergii* and either of them.

There are not in collections a large number of specimens of *I. tinctoria* from America; it does not appear ever to have been greatly in favour there as a source of indigo. Very few indeed of these specimens are referable to the Madras, almost all being the northern form of the species. Most are from the West Indies; a few are from Florida (Island of Key West); none have been communicated from the continent of America. From Africa, apart from the wild form in Nubia which we think probably the original condition of *I. tinctoria*, cultivatedexamples have been communicated only from the Mascarene Islands, the Canaries and Cape de Verde Islands, Socotra, and from places near the coast both on the Mozambique and on the Angola-Senegal side. It is interesting to notice that practically all the specimens from Angola to Senegal are of the northern form; many of the Mascarene, Mozambique, and Socotra specimens are of the southern or Madras cultivated form.

Rumphius, Amb. v. t. 80, cited under *I. tinctoria* α *macrocarpa* by De Candolle, is to be deleted; it is a representation of *I. Anil* L. var. γ *olygosperma* Miq. (= var. δ *asperma* Zoll.), the form of *I. Anil* propagated by offsets and cuttings instead of by seeds. *I. cærulea* Roxb., doubtfully referred here by De Candolle, is the eastern form of *I. articulata* Gouan, the "Nil" of Egypt and Rajputana, as opposed to the "Nil" of Northern India.

I. madagascariensis Schrank ex Colla, Hort. Ripul. App. 2, 350 (1826), judging from description, mnst be referred to *I. tinctoria* L.

This plant must not be confused with *I. madagascariensis* Vatke in Bremen. Abh. vii. (1882), p. 245, also, as the name implies, from Madagascar. *I. cinerascens* DC. Prodr. ii. 226 (1825) must also be reduced to *I. tinctoria.*

I. TINCTORIA β BRACHYCARPA DC. Prod. ii. p. 225 (1825), "leguminibus abbreviatis crassioribus 3-4 spermis. *I. Guatimala* Lun. Hort. Jam. i. p. 420. Fl. Mex. ic. ined.? An species propria? (v. v. cult. in hort. Eur.)."

I. brachycarpa Graham in Wall. Cat. 5470 = *I. tinctoria* L. var. *brachycarpa* Baker, non DC., is a synonym of *I. argentea* L. var. *cœrulea* (Roxb.), and has nothing to do with the *Prodromus* plants included under this variety. These plants are as follows:—(1) Two specimens of the cultivated form of *I. suffruticosa* Mill. (*I. Anil β polyphylla* DC.), without precise locality. One of the two is from L'Héritier, the other of unknown origin. (2) A third specimen of the same form from Trianon. (3) A specimen of the wild form of *I. Anil β polyphylla* from Jard. des Plantes. (4) A specimen of *I. truxillensis* (*I. Anil α oligophylla*) from Trianon. (5) Two specimens of *I. truxillensis* (*I. Anil α oligophylla*) from Jardin Botanique d'Orotava; and, lastly (6), a single specimen from Herb. Thibaud of a plant figured by Moçino & Sessé as *Indigofera guatimalensis*, referred to on page 225 of Prodr. vol. ii. line 1. It is not the *I. Guatimala* of Lunan; that plant is simply *I. suffruticosa;* it is, however, the same as *I. guatimalensis* Poeppig MSS. in Herb. Brit. Mus. The nearest ally of this plant is *I. densiflora* Mart. & Galeotti, which, however, may be distinct, as its pods have no stipe within the calyx, as is usual in this. The whole of *β brachycarpa* DC. has been transferred by Berg to *I. Anil* as *I. Anil β brachycarpa.* This is the form in Plant. Sintenis to which Urban limits the name *I. Anil β brachycarpa.* It is, however, quite distinct specifically from *I. Anil*, and must either be regarded as a variety of *I. densiflora* or as a distinct species, with the synonymy:—

I. guatimalensis Moçino, Sessé & Cervantes in Herb. De Candolle, Ic. ined.; Poeppig MSS. in Herb. Brit. Mus.; MSS. et Herb. De Candolle.

I. tinctoria var. *β brachycarpa* DC. Prodr. ii. 224. (1825) in part; Berg in Berg. & Schmidt, Offiz. Gewach. iv. (1863) in part; Urban in Plant. Sintenis, no. 5604.

Besides the Prodromus Herbarium examples, we have seen the following specimens of this plant:—Guatemala, *Bernouilli & Cario*, no. 1189, *Herb. Kew.; Sintenis*, no 5604, *Herb. Brit. Mus.* Venezuela, *Fendler*, no. 1795; *Herb. Kew.* Central America, *Ruiz & Pavon; Herb. Brit. Mus.* Suburbs of Guayaquil, *Jameson*, no. 338; *Herb. Brit. Mus.* Cuba, *Ramon de la Sagra*, no. 94. "Indigofera de Guatemala, cult à la Havane." Peru, *Dombey*, no. 872; *Poeppig*, no. 1572.

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NOTES ON INDIGOFERA.

BY DAVID PRAIN, F.L.S., AND EDMUND BAKER, F.L.S.

(Concluded from p. 67.)

I. HIRSUTA L. Sp. Pl. p. 751 (1753).

The original description runs:—

"Indigofera leguminibus pendulis lanatis tetragonis. Fl. Zeyl. 272. Amoen. Acad. i. p. 408.

Astragalus spicatus siliquis pendulis hirsutis, foliis sericeis, Burm. Zeyl. 37, t. 14.

Kattu-tagera. Rheed. Mal. i. p. 55, t. 30.

Habitat in India."

There is a specimen of this in Herb. Hermann, no. 272, which is this plant as we now understand it.

Plukenet's synonym for this plant, *Colutea orientalis plerumque heptaphyllis, &c.* (confer Alm. p. 113), quoted by Linnæus in the Fl. Zeylanica, as will be seen, is omitted from the description in Sp. Pl.

There is a specimen among the Petiverian plants in Herb Sloane, vol. 161, p. 83, which bears the name "Colutea lanuginosa floribus parvis siliquis pilosis deorsum tendentibus," which, as will be seen, is also quoted by Linnæus in Fl. Zeylanica, but omitted in Sp. Pl. ed. 1.

This is the *I. indica* of Miller (Dict. ed. viii. 1768, no. 4).

I. GLABRA L. Sp. Pl. p. 751 (1753).

"Indigofera leguminibus horizontalibus teretibus, foliis pinnatis ternatisque. Fl. Zeyl. 274. Amoen. Acad. i. p. 408.

Colutea siliquosa glabra, ternis quinisve foliis, maderaspatana, semine rubello. Pluk. Alm. 113, t. 166, f. 1.

Nir-pulli. Rheed. Mal. 9, t. 67. Ray Suppl. 470.

Hab. in India. ⊙."

This plant is in Herb. Hermann, no. 274, and also in Herb. Sloane, vol. 96, f. 186. The name *I. glabra* takes precedence of

I. pentaphylla Murray, Syst. Veg. ed. xiii. p. 564 (1774). This is also *I. fragrans* Retz, Obs. p. 29 (1786), which was collected by Koenig.

I. DISPERMA L. Syst. Nat. iii. Appendix, p. 232 (1768); Berg in Berg & Schmidt, Darstell. u. Beschr. Officin. Gew. iv. 30 (1863).

I. caroliniana Miller, Gard. Dict. ed. viii. no. 3, probably (1768).

I. caroliniana Walter, Fl. Carolin. p. 187 (1788).

I. disperma is taken up by Linnæus from Trew Ehret. 24, t. 55; he had no specimen of it.

I. ANIL L. Mant. ii. p. 272 (1771).

Linnæus diagnoses and describes this plant, but no synonyms are quoted; the plant itself is exactly the same as *I. suffruticosa* Miller, Gard. Dict. ed. viii. no. 2 (1768).

Before discussing the propriety of recognizing the older name, it will be more convenient to deal with the treatment accorded to *I. Anil* by De Candolle. He recognizes three varieties:—

a OLIGOPHYLLA DC. Prod. ii. p. 225. Foliis 3–4 jugis leguminibus arcuatis. Sloane, Jam. t. 176, f. 3. Lam. Ill. t. 626, f. 2 (v. s. specimen e Sancto-Domingo et ins. Maurit.).

In so far as this variety is based on Sloane's figure and description, there is no room for doubt, for the type from which the drawing is made is present in the Sloane Herbarium. The plant there is what we now know as *I. truxillensis* H. B. K., and, though nearly allied to *I. Anil*, it is perhaps better treated as distinct. But, while this is the case, it has to be remembered that on the same sheet with two specimens of this variety *a oligophylla* there is glued down a specimen of the cultivated form of *I. Anil β polyphylla* DC. (which is *I. tinctoria* Miller, not of Linn. nor of Forsk.), and on the next sheet is an example of the wild form of *I. Anil β polyphylla* DC. (which is *I. suffruticosa* Miller, *I. Anil* L., and *I. Guatimala* Lunan). This Sloane has marked "præcedentis varietas."

When now we turn to the Prodromus Herbarium, we find that the material which has been placed in the cover of *I. Anil* consists of two specimens—(1) a specimen collected by Bory St. Vincent, locality not noted, which is actually = *a oligophylla*, i.e., is *I. truxillensis* H. B. K.; and (2) a specimen from San Domingo, collected by Poiteau. This, however, instead of being *I. truxillensis*, is the Indian *I. tinctoria*, and is not distinguishable from the form of *I. tinctoria* figured by Sloane, t. 179, f. 2.

I. truxillensis H. B. K. (*I. tinctoria a oligophylla* DC.) is very far from being a common plant. Besides the specimens from the Orotava Garden and from Trianon, and that from Bory St. Vincent in Herb. De Candolle, the only specimens we have seen, beyond the specimens that form Sloane's types, are as follows:—Prov. de Bogota, Quetame, *Triana*! Guayamas, Mexico, *Palmer*, 102! Porto Rico, *Sintenis*, 146! 3682! Bolivia, at Larecaja, *Mandon*, 791! Columbia, near Bogota, *Hartweg*, 953!

It would almost appear, then, as if this species had been the species principally cultivated in the West Indies in Sloane's time, but that the cultivation of a form of the next species was already becoming the practice, and that soon the use of *I. truxillensis* was to give place to that of *I. Anil* L. (i.e., *I. suffruticosa* Miller). It will be seen, however, from the following reference in Sloane (Cat. Plant. p. 142 (1696), to the plant subsequently figured in Nat. Hist. Jam. t. 176, fig. 3 (which we consider to be *I. truxillensis* H. B. K.), that even in Sloane's time a good deal of obscurity existed as to the original source of American indigo:—

"Coluteæ affinis fruticosa argentea, floribus spicatis e viridi purpureis, siliquis falcatis. An herba e qua glastum vulgo anil exprimitur, in regno novo Granatensi sponte crescens. Laet. p. 380? An Colinil Hort. Mal. part 1, p. 103? seu polygala indica minor siliquis recurvis Syen. ib. p. 104? An Colutea Currassavica argentea angustifolia Par. Bat. pr. p. 325? *Wild Indigo.* In locis apertioribus & sterilioribus Jamaicæ & Caribearum Insularum ubique sponte nata reperitur."

It will be noticed that, while this is termed "Wild Indigo," it is not the "Wild Indigo called Guatimala" of Petiver.

β POLYPHYLLA. Foliis 5–7-jugis leguminibus arcuatis. I. Cornezuelo, Fl. Mex. ic. ined. (v. s. specimen ex Cayenna, Martinica, Sancto-Domingo). An species propria?

I. Anil of Linnæus and *I. suffruticosa* of Miller, which are the same thing, are *β polyphylla* DC.; but De Candolle's variety includes besides these the *I. tinctoria* of Miller, not of Linnæus, which is the cultivated form of the same species. It is, as a rule, inadvisable to supplant a name that has become so familiar in usage as the name *I. Anil* by one that happens to be a little older, but that has been practically lost sight of. In this case, however, it seems better to let the Linnean name fall out of use and to replace it by the older name *I. suffruticosa*, because the name used by Miller gives rise to no misconception, while the Linnean name may do so. The name *Anil*, though not inappropriate as a generic term, is not good as a specific one, because it is merely an elaboration of the vernacular word Nil, which alike in Egypt and in India indicates a species that supplies the Indigo-dye. The name, however, in Egypt connotes *I. articulata*, in India *I. tinctoria*, and, though doubtless the peoples of both countries might apply the same name to *I. Anil*, they do not do so in either, because *I. Anil* will not grow in Egypt and is not in favour in India. Had Linnæus applied the word *Anil* as a specific epithet to either *I. tinctoria* or *I. articulata* the term, though not distinctive, would have been sufficiently apposite. But, as matters stand, he has applied the name to the species to which it is never applied in those countries where the term "Nil" originated. Doubtless he used the word because the name *Anil* is given in the Spanish-speaking parts of America to this species, but this application of the name by the common people of the New World is only a reflection of the erroneous notion which they seem to share with the learned (cfr. Morong, Plant. Paraguay), that *I. Anil* is an East Indian plant. The plant exists in two fairly easily distinguishable forms—(1) the cultivated, usually less, and (2) the wild, usually rather more pubescent. These forms cannot, however, be separated as distinguishable varieties.

The oldest reference that we can find to the cultivated form is that by Hernandez in his *Nova Plant. Hist.* p. 108 (1651), where he figures and describes *xivhqvilitl pitzahac* seu *Anir tenuifolia*, which by exclusion can only be *I. Anil β polyphylla* DC. The number of seeds exclude *I. densiflora* Mart. & Gal.; and *I. Thibaudiana* DC. is equally excluded by the shape of the leaflets. The same character excludes *I. tinctoria* L., which, moreover, had probably not reached America from the East Indies in Hernandez's time.

The wild form of this species is the plant known as

I. GUATIMALA Lunan, Hort. Jamaicensis, p. 420 (1814).

Lunan, *l. c.* quotes for this "Indigofera 2. Assurgens minusque divisa, ramulis crassioribus striatis, spicis axillaribus." P. Browne, Nat. Hist. Jam. p. 302 (1789), where it is called "The Guatimala Indigo Plant."

De Candolle (Prodr. ii. p. 225) considers it synonymous with *I. tinctoria* L. *β brachycarpa* DC., but (see note on this variety) De Candolle's plant is not Linnæus's *I. Guatimala*, but is the *I. guatimalensis* of Moçino & Sessé, and of Poeppig. In Herb. Sloane, vol. 184, f. 8, amongst Dr. Petiver's plants is a specimen with the label "Wild Indigo cald Guatimala. Jam. HB.," which is the wild form of *I. Anil* L. (= var. *β polyphylla* and = *I. suffruticosa* Mill.). There is in the library attached to the National Herbarium a manuscript of Patrick Browne entitled: "A Catalogue of the Plants of the English Sugar Colonies"; on p. 52, he has under the head *Indigofera* three plants:

"1. Caule lævi, spicis ad imum usque floriferis. Slo. t. 179, 2.
2. Caule stricti, spicis imo nudis. Guatimala or Wild Indigo.
3. Subvillosa Colutea, &c. Slo. 176, 3."

No. 1 is *I. tinctoria* L.—the form *I. indica* Lam. No. 2 is the same as the afore-mentioned Petiverian specimen—the true *I. Anil*. No. 3 is *I. Anil* L. *α oligophylla* DC.—that is, *I. truxillensis* H. B. K.

Patrick Browne's specimens went to Linnæus's Herbarium (purchased for Linnæus by Solander); the probability therefore is that the solitary specimen of *I. Anil* in that herbarium, which is of the wild form of the plant, is from Browne. Browne (Nat. Hist. Jamaica) deviates a little from this treament; there his *Indigofera* 1 is the same as No. 1 of the MS. List; but he refrains under either Nos. 2 or 3 from quoting a Sloane figure, and he there further separates Guatimala Indigo and Wild Indigo; thus practically transferring the term "wild Indigo" to *I. truxillensis*, as had been done in 1696 by Sloane. The explanation of the apparent discrepancy may be that both Sloane and Browne use the term "wild" as equivalent to native American, as opposed to *I. tinctoria* or introduced East Indian Indigo. If this supposition be correct, the term wild was equally applicable both to *I. truxillensis* and to *I. suffruticosa* = *I. Anil*.

It may be noted here that *I. divaricata* Jacq. Hort. Schoenbr. t. 365 (1798), is simply *I. suffruticosa* Mill. (*I. Anil* L.). It is, however, only right to state that, so far from agreeing that *I. truxillensis* H. B. K. (*I. Anil α oligophylla* DC.) and *I. suffruticosa* Mill. (*I. Anil β polyphylla* DC.) are different species, Berg, in Berg & Schmidt, Darstell. u. Beschreib. Offiz. Gewächs. iv. 30 d. (1863), does not even agree with De Candolle in thinking them varietally distinct, and has renamed the two conjointly *I. Anil α drepanocarpa.* The explanation of this treatment is not obvious, but the probable explanation is that some confusion had taken place among Berg's specimens because, as it happens, the plant which he has figured as *I. tinctoria,* loc. cit., is not that species at all, but is *I. suffruticosa* Mill. (*I. Anil* L.), the very plant that in the text he has united with *I. truxillensis* (*I. Anil α oligophylla*) to form his *I. Anil α drepanocarpa.* Berg's *I. Anil* var. *β brachycarpa* is De Candolle's *I. tinctoria β brachycarpa,* which, in so far as it is different from *I. Anil* or *I. truxillensis,* is *I. guatimalensis* Moçino & Sessé, the plant that not only Moçino & Sessé, but Ramon de la Sagra and Poeppig assert to be Guatimala Indigo. Here again, therefore, a change of opinion or belief has taken place. The plant that in the time of Sloane and Petiver and P. Browne was known as Guatimala Indigo was the *I. suffruticosa* of Miller, the *I. Anil* of Linnæus, the *I. Guatimala* of Lunan; by the time of Moçino & Sessé and of La Sagra this name was used for *I. guatimalensis* of Moçino and of Poeppig (*I. tinctoria β brachycarpa* DC.).

I. ANIL γ ORTHOCARPA DC. *l. c.* Leguminibus deflexis rectis. Rump. Amb. v. tab. 80? (v. s. ex Madagascar et India Orient.).

The figure from Rumphius is that of a form of *I. Anil* (*I. suffruticosa*); the specimens in the Prodromus Herbarium are three in number—(1) a specimen with no note of collector or locality which is not a form of either *I. tinctoria* or *I. Anil;* (2) a specimen marked "Indes, Labillardière," which is the Northern Indian form of *Indigofera tinctoria;* (3) a specimen from Madagascar with no note as to the collector, which is the southern or Madras form of *I. tinctoria.*

It will be recollected that the plant taken for *I. Anil γ orthocarpa* by Schimper, Berg, and Baker, and treated by the two latter and by Vatke as a distinct species, is also a form of *I. tinctoria,* but is somewhat different from either of the forms of the species included by De Candolle under *I. Anil γ orthocarpa.*

I. ARGENTEA Burm. Fl. Ind. p. 171 (1768), non L.
I. semitrijuga Forsk. var. *β tetrasperma* DC. Prod. ii. p. 230.
I. Burmanni Boiss. Fl Or. ii. p. 189 (1872).

We are inclined to agree with Boissier that *I. semitrijuga* Forsk. is conspecific with *I. enneaphylla* L. When describing his *I. Burmanni,* he stated that it differed from *I. semitrijuga* in having "racemis laxis et leguminibus elongatis (5–7 lin. longis) 4–6 nec 2 spermis." We are also inclined to agree with Vatke (in Oest. Bot. Zeit. xxvii. p. 202) that *I. Burmanni* and *I. tetrasperma* are hardly to be retained as distinct species.

Dr. T. Cooke, however, is inclined to think that, while the *I. semitrijuga* of the *Flora of British India* is certainly De Candolle's variety *β tetrasperma,* and is therefore *I. argentea* Burm., the original *I. semitrijuga* Forsk. is specifically distinct.

I. ENNEAPHYLLA L. Mant. ii. p. 272 (1771).

Some confusion occurs in the synonymy in the original description of this plant, and Linnæus entirely revises it in the

Appendix to the *Mantissa*, p. 571. The first synonym, *Psoralea pinnata*, is in Harvey's *Flora Capensis*, and by other botanists considered now as a true *Psoralea*. The synonym "Colutea enneaphyllos, &c. Pluk. 113, t. 166, fig. 2" is the plant as we now understand it; but the next, "Colutea enneaphyllos siliquosa, &c. Pluk. Alm. 112, t. 166, fig. 3," is *I. viscosa* Lam.

[*] *Hedysarum prostratum* Burm. Fl. Ind. t. 54, fig. 2 (*sic*); L. Mant. p. 102 (1767), for which "Colutea minima dispermos. Pluk. Phyt. t. 165, fig. 4" is quoted, is *I. enneaphylla* L.; and Burmann's name and plate are quoted by Linnæus in his revised diagnosis on p. 571.

I. ARTICULATA Gouan, Illustr. p. 49 (1773).
I. argentea L. Mant. ii. p. 273 (1771), excl. syn., non Burm.; L'Héritier, Stirp. t. 79 (1784).
I. spicata Forsk. Fl. Æg. Arab. p. 138 (1775).
I. houer Forsk. Fl. Æg. Arab. p. 137 (1775).
I. glauca Lam. Dict. ii. p. 246 (1789).
I. cœrulea Roxb. Hort. Beng. p. 57 (1814).
I. brachycarpa Graham in Wall. Cat.
I. retusa Graham in Wall. Cat.

This has generally been called *I. argentea*, but the species bearing this name, described by Burmann in his *Flora Indica*, is earlier in date of publication (1768), and is altogether different. Linnæus, when describing his *I. argentea*, quotes two synonyms:—

1. "Anil leguminibus arcuatis incanis, &c. Miller, Dict. 1." This is *I. Anil* L., but is Miller's *I. tinctoria*, as his specimen so named in the National Collection shows.

2. "Colutea fruticosa argentea, &c. Sloane, Jam. p. 142; Hist. 2, p. 37, t. 176, fig. 3." There are two sheets of this in the Sloanean Herbarium. The first has three specimens—two are the plant figured by Sloane which is *I. Anil* L. var. *oligophylla* DC., the third being the plant which is var. *polyphylla* DC. Sheet 2, marked by Sloane "præcedentis varietas," is wholly occupied by *I. Anil* L. var. *polyphylla* DC. The Linnean description refers to the plant we now call *I. articulata* Gouan.

Chabræus (*Stirpium*, p. 82 (1666)) figures and describes a species which he names "Coluteæ foliis anil." As will be seen from the following description, this can only apply to *I. articulata* Gouan (= *I. argentea* L., excl. syn.), the Nil of Egypt, but not of India:—"Sunt nobis *Anil* nomine rami duo missi, pedales, similes fere ramis Cytisi lata siliqua, rigiduli, incani, & fere argentei: in folia divisi Coluteæ vulgaris, ovata glauca quinquefolia communiter, rarius trifolia, ex communi costa incana. De flore & semine nihil certi nobis constat. Facies tamen plantæ satis insinuat ad Coluteas referri posse." This figure has frequently been quoted incorrectly; thus, for instance, Dr. Petiver (Phil. Trans. 1700, p. 703) quotes it under his No. 57, "The true Indigo"—his specimen being *I. tinctoria* L.

Gouan, when describing his species, quotes a synonym and figure from Zanoni (Hist. p. 18, tab. 12): "Anil africanum siliquis brevibus articulatis." Gouan's synonymy and description leave no doubt as to the species intended, and there are specimens from him in Herb. Kew.

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[*] Burmann's plate of *H. prostratum* is tab. 55, fig. 1, correctly quoted by Linnæus on p. 571.

There is a specimen of Forskahl's *I. spicata* in the British Museum Herbarium which is certainly referable here. *I. glauca* Lam. is quoted by De Candolle as a synonym of *I. argentea* L., non Burm. Lamarck quotes the afore-mentioned figure from Zanoni, and this is also *I. articulata*. *I. brachycarpa* Graham in Wall. Cat. 5470 (= *I. tinctoria* L. var. *brachycarpa* Baker, non DC. Prod. ii. p. 224) is correctly placed in the *Flora of British India* as a synonym of the var. *cœrulea* of *I. argentea* L., non Burm.

I. brachycarpa Graham and *I. retusa* Graham are quoted by Miquel as synonyms of *I. Anil* L. β *polyphylla*, which they are not; both of them are the *I. cœrulea* Roxb.

Linnæus in his herbarium never used the name *I. argentea*, the solitary specimen of *I. articulata* Gouan in that collection having been named by Linnæus himself *I. tomentosa*. This name has been corrected to *I. argentea* by Smith. *I. tomentosa* Herb. Jacquin is *I. Anil* L.

In *Species Plantarum*, ed. iv., *I. houer* is quoted as a synonym of *I. tinctoria*; it is, however, of *I. tinctoria* Forsk., the "Nil" of Egypt and Nubia; not the earlier *I. tinctoria* L., the "Nil" of India, whereof *I. houer* is a synonym. *I. houer* is the form of *I. articulata* which extends to Scinde and Rajputana from Arabia, and stands intermediate in characters as it does in locality between the Egyptian or original form of *I. articulata* and the eastern state of the same species named *I. cœrulea* by Roxburgh.

The *Index Kewensis* cites *I. houer* by mistake as = *I. lateritia*.

I. **OBLONGIFOLIA** Forsk. Fl. Æg. p. 137 (1775).

I. paucifolia Delile, Fl. Ægypt. p. 251 (1812).

I. desmodioides Baker in Kew Bulletin, non Baker in Journ. Linn. Soc., is identical with the above. See Vatke in Oest. Bot. Zeit. xxvii. p. 201 (1877).

I. **LINIFOLIA** Retz, Obs. iv. p. 29 (1786); vi. p. 33, tab. 2 (1791).

Hedysarum linifolium L. fil. Suppl. p. 331 (1781).

Linnæus quotes this from "India orientali. König." Koenig's specimens are in the National Herbarium—his MS. diagnosis for this species was:—

"Herbacea. Foliis simplicibus lineari-angustis canescentibus. Leguminibus globosis niveis, monospermis: habitat in ruderatis ad pedes montium minus frequens."

I. **ATROPURPUREA** Buch.-Ham. ex Roxb. Hort. Bengal, p. 57 (1814).

In the British Museum Collection there is a sheet named by Roxburgh *I. atropurpurea* Buch.-Ham. This is the plant usually accepted under this name, and it shows what Roxburgh meant in the *Hortus Benghalensis* (1814). The same plant was issued as *I. atropurpurea* Hb. Roxb. in Wall. Cat. 5463 (date 1814). The sheet which Buchanan-Hamilton in his own hand named *I. atropurpurea*, the type of the plant described in Don's Prod. p. 244 (1825), collected at Narainhetty, 7 Feb. 1803, is *I. pulchella* Roxb.

I TRUXILLENSIS H. B. K. Nov. Gen. et Sp. vi. p. 456 (1823).

See note on *I. Anil* L. var. *a oligophylla* DC.

The *I. Anil* of Lunan, in so far as it is based on Sloane (Nat. Hist. Jam. tab. 176, fig. 3), is this species.

I. THIBAUDIANA DC. Prod. ii. p. 225 (1825).

Bentham, in a note at the end of *Indigofera* in Martius' *Flora of Brazil*, correctly refers to this species *I. excelsa* Mart. and Gal. in Bull. Acad. Brux. x. 1843, p. 45, and *I. costaricensis* Benth. in Kjoeb. Vidensk. Middel. 1853, p. 5.

I. LEPTOSTACHYA DC. Prod. ii. 225 (1825) = *I. pulchella.*

I. MULTICAULIS DC. Prod. ii. p. 223 (1825).

I. trifoliata Don, Prod. Fl. Nepaul, p. 245 (1825).

I. canescens Spreng. Systema, iii. p. 274 (1826).

Buchanan-Hamilton's specimen from Suembu, upon which the above was founded, is in the National Herbarium. It is, as stated in Fl. Brit. India, synonymous to *I. trifoliata* L.; the var. *multicaulis* Miq. is hardly *I. multicaulis* DC.

I. DOSUA Buch.-Ham. in Don, Prod. Fl. Nepaul, p. 244 (1825); DC. Prodr. ii. 225 (1825). *I. polyphylla* DC. *l. c.* 227.

Buchanan-Hamilton's specimen from Suembu is in the National Herbarium; it is referred to in DC. Prodr., but is not at present in the Prodromus Herbarium. The same species is in the Prodromus Herbarium, however, where it forms the type of *I. polyphylla* DC. Prodr. ii. 227 (1825).

I. BUNGEANA Walp. in Linnæa, xiii. p. 525 (1839); Steudel, Nomenclator, part 1, p. 806 (1840).

I. micrantha Bunge, Enum. Pl. Chin. Bor. p. 16, nec alior.

I. tinctoria Forbes & Hemsley, Index Fl. Sinensis, p. 157 (1886–88) in part.

The last-named is in part (*e.g.*, Amoy, Fortune, A. 56. Herb. Mus. Brit.) the above species; we have also seen plants referred to *I. tinctoria* from Japan by Maximowicz, which in our opinion also belong here.

I. TEYSMANNI Miq. Fl. Ind. Bat. i. 1083 (1855).

I. Zollingeriana Miq. *l. c.* p. 310 (1855).

Tephrosia ? sp. Zoll. in Nat. en Genesk. Arch. iii. p. 54 (1846).

I. galegioides Vidal, Pl. Cuming. p. 107, non DC. (1885); Vidal, Pl. Vasc. Philip. p. 105, non DC. (1886).

I. Benthamiana Hance in Ann. Sc. Nat. ser. iv. xviii. (1862), p. 219.

We have seen specimens of this species from China, Formosa, Tonkin, Saigon, Philippines, Moluccas, Sumatra, Java, Borneo, Perak, Malacca, and New Caledonia.

I. ARRECTA Hochst. in Schimp. Hb. Alyss. No. 1923; Baker in Fl. Trop. Afr. ii. p. 97 (1871).

I. umbonata Welw. MSS.; Baker, *l. c.* 98.

I. Anil Guill. & Perr. & Rich. Tent. Fl. Seneg. p. 180 (1831-33).

This must not be confused with *I. arrecta* Bentham, from South Africa, as the above species also reaches the Cape. For the latter, which is later of publication, we propose the name I. CONFUSA.

This is the well-known Degendeg (Dek Indig) of Abyssinia, and is the chief Indigo-producing species in Africa outside the area occupied by *I. articulata*. It is now largely cultivated in Java as "Natal Indigo" under the erroneous name *I. leptostachya*. It is not the true *I. leptostachya* DC., which is a form of *I. pulchella*; nor is it Zollinger's *I. leptostachya*, which is a form of *I. tinctoria*.

I. LONGERACEMOSA Boivin ex Baillon in Bull. Soc. Linn. Par. i. (1883), p. 399.

I. tinctoria L. var. *brachycarpa* Vatke in Oest. Bot. Zeit. xxviii. p. 214, 1878, non DC.

The type was from Madagascar, *Boivin*, no. 2214 *bis*, Nossibé, in collibus herbosis inter Djabal et Hellville ad Amponbilavi. Other specimens are—Nossibé, *Perrillé*. Maroa, forêts à l'intérieur de la baie d'Antongil, *Mocquerys*, no. 45. Insel Sansibar, *Hildebrandt*, no. 941.

Col. Beddome has specimens from the Tinnevelly Hills and from S. Travancore that are not distinguishable from the above.

The following note occurs in Baillon's description:—"Sect. *I. tinctoriæ*, cui ad tingendum, ex incolis, planta anteponenda."

I. CUERNAVACANA Rose in Contrib. U. S. Herb. vol. v. No. 3, p. 140 (1897).

Hab. Cuernavaca, *C. G. Pringle*, 1896, no. 6323; *Bourgeau*, no. 1192.

Closely allied to *I. excelsa* Mart. & Gal. (*I. Thibaudiana* DC.) from which it mainly differs by its smaller flowers.

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QÁT OR ARAB TEA.

A SPECIMEN of *Qât*, usually referred to in botanical works as *Catha edulis*, is now in flower in the Royal Botanic Garden, Calcutta, to which it was introduced, somewhat accidentally, in 1892.

The genus *Catha* belongs to the family of *Celastrineæ* or "Spindle-trees," and is at present limited so as to include only this one species, *Qât;* a shrub found in a wild state in Abyssinia, where it is said to be also cultivated. It is likewise found in Arabia and, according to Forskael who first described the plant, the Arabs cultivate it, along with *Coffee.* They eat the green leaves, he tells us, because they attribute to them the property of enabling a man to do 'sentry go' all night without wishing to sleep. He says, too, that they look on it as an antidote to plague, declaring that anyone wearing a sprig of this plant may go without risk among the infected, and believing that, wherever this shrub is planted, the plague cannot come. But Forskael adds that the taste of the leaves does not appear to indicate such virtues. Botta found that in Yemen just as much importance is attached to the cultivation of *Qât* as to that of *Coffee* itself. He speaks of wild as well as cultivated plants, but it is not at all clear from his account whether these wild plants are indigenous or only escaped and naturalised ones. It is true, as DeCandolle says, that the interior of Arabia is nearly unknown to botanists; this makes it somewhat uncertain what plants are, and what are not indigenous to the Arab Peninsula. But as regards *Coffee*, it is almost certain, in spite of its popular association with Mocha, and in spite of its being named *Coffea arabica*, that the plant is a native of the African side of the Red Sea, and is only an introduced plant in Arabia. DeCandolle is therefore (*Origin of Cultivated Plants*) inclined to think that probably the two plants, *Qât* and *Coffee*, were introduced together from Abyssinia; and Boisser, who made a study of the plants of this region to a great extent the work of his life, clearly did not accept *Qât* as a native of Arabia, because he does not include the species in his celebrated *Flora Orientalis*.

Hochstetter in *Flora*, for 1841, says that in Abyssinia an infusion, just like *Tea*, is made from the leaves; but a correspondent of the *Gardeners' Chronicle*, for 1843, writing from Yaush in Shoa, November 1842, says very definitely that the Abyssinians only use it in building their houses, mostly structures of wattle and daub, for which the thin stems and branches of this shrub must be very well adapted. No other use, this writer says, is made of the plant except by the Mussalman merchants, who chew the leaves in order to prevent sleep. These merchants, he adds, have transported the plant into the country of the Yedjon Gallas, where it is largely grown, but is, nevertheless, not used as an article of trade. In Arabia on the contrary (*Treasury of Botany*) *Qât* forms a considerable article of commerce, large quantities of twigs being annually brought to Aden from the interior of the Peninsula; some of these, according to Watt, even reach Bombay. For export the twigs are made up into compact bundles, varying in size according to quality; the best kind comes in bundles 12-15 inches long by 3 inches wide, consisting of about 40 twigs neatly bound together by strips of fibrous bark or tightly packed in palm-leaves. A thousand camel-loads of these bundles, according to the *Gardeners' Chronicle* for 1890, reach Aden every year.

The plant seems, as a matter of fact, to be used chiefly as a stimulant and a food-accessory, just as *Coffee*, *Tea*, *Maté*, and *Coca* are. Of the four, *Qât* appears most to resemble *Coca* in its effects. It enables the user, so it is said, to undergo prolonged muscular exertion without fatigue or to sustain hunger without inconvenience. The use of the leaves which, besides being chewed like those of *Coca*, fresh or dried, are also infused like *Tea*, induces a feeling of exhilaration and excites cheerfulness of spirits; for this reason, according to Botta, and to Deflers, the leaves are liberally distributed at religious rites, domestic festivities, and visits of ceremony; Botta speaks of one sheik, obliged to receive many callers, who had to spend, on *Qât* alone, as much as 100 francs a day! The fresh leaves, which taste, to the writer's mind, very like the leaves of *Coca*, are said by Botta to be sometimes very intoxicating; the writer cannot corroborate this from his own experience. It is true that Botta credits this quality to the leaves of wild plants. In the *Gardeners' Chronicle* for 1843, a woodcut is given of a twig, said to be from a specimen gathered by Bové. This woodcut is used again by Lindley in his *Vegetable Kingdom*; it will be referred to critically below. In connection with this drawing it is remarked that leaves gathered when the plant is three years old are sold as *Qât mubarreh* or "inferior," a year later young shoots are gathered and fetch a higher price. The Abyssinian correspondent also refers to two varieties, but in a somewhat different way; he calls them the "red" and the "white," distinguished by the colour of the wood and young leaves, and (though of this he is not quite certain) the flowers also. To this question of different kinds, too, further reference will be made.

When it is a plant of economic importance that is under discussion, the writer's experience commonly is that there is some confusion as regards its name; *Qât* is no exception to this rule. The name usually given to the plant is *Catha edulis*; the authority quoted is Forskael, *Flor. Aegypt.-Arab.* p. 63 (1775). The first writer to make this citation is Vahl, *Symbol.* i., p. 21 (1790), who himself named the plant *Celastrus edulis*. The citation can only be explained as a *lapsus calami* because in the place quoted Forskael does not use the name *Catha edulis*. He described the plant rather more carefully than most subsequent writers have done, but omitted to name it; so far as the writer can ascertain, Forskael never did publish a name for the species. Vahl's inexact citation has, however, been usually accepted as accurate, but it is not clear if *Catha edulis* be the true name of the plant. It certainly is not on Forskael's authority that it can be taken up if it be the true name. This is, however, a trifling matter. More important is the question as to the arrangement of its leaves and branches.

Forskael's account, which is rather more careful than some subsequent ones, states:—"Branches alternate, axillary; branchlets green, annual, articulate; leaves opposite, on the large branches alternate." Vahl, copying from Forskael, but varying the expressions, says:—"Branches alternate; branchlets articulate, alternate; leaves alternate, on the branchlets opposite." Don (*Gen. Syst. Gard.* 1832) says briefly:—"Leaves opposite and alternate." Hochstetter (*Flora*, 1841) says:—"Leaves opposite." Lindley's figure in the *Gardeners' Chronicle* for 1843 and in his *Vegetable Kingdom* (1853) shows a pair of opposite leaves, *with flowers in their axils*, at the base of the twig, and two alternate leaves, *without flowers*, above. The *Genera Plantarum* (1862), apparently following Hochstetter, says:—"Leaves opposite;" the *Treasury of Botany* (1866) says:—"Leaves opposite on some branches and alternate on others;" Oliver (*Flor. Trop. Afr.*, 1868) says:—"Leaves opposite; or alternate on the leafy shoots." In the *Histoire des Plantes* (1875) Baillon says:—"Leaves usually opposite." Finally Loesener, the last important author who has dealt with *Qât*, says: (*Engler's Naturlich.-Pflanzenfam.*, (1896):—"Leaves opposite on fertile twigs, often alternate on the sterile." Forskael's account is thus the fullest and, it may be added, is also the most accurate on the point; that even it is not clear we can see from the indecision and the discrepancies of subsequent writers. It may therefore not be superfluous to explain exactly what does happen and what the conditions, as exhibited by plants that the writer has watched for eleven years, really are.

In 1892 some twigs were sent from Hodeida for identification; they were specimens of a kind very familiar to the Editor of *Indian Planting and Gardening*, and to the writer, for they had neither flowers nor fruits, and had been placed in a letter without having been previously dried. They reached their destination a mass of pulp so far as the leaves were concerned, but, as there seemed to be some vitality in the twigs, an attempt was made to strike them as cuttings. Of the twigs that had, as their leaf-scars showed, borne opposite leaves none survived; of those that had borne alternate leaves a fair proportion held. In, as was then supposed, (though now it is clear this was not exactly what happened), the axils of these leaves small buds broke and gave rise to nearly vertical shoots with red bark and alternate leaves. These shoots gave the plant a fastigiate character; they increased in length for two seasons, retaining nearly all their leaves but not branching. In their third season, the axils of the lowest leaves, corresponding to the first season's growth, gave origin to branchlets quite different in appearance from the branches produced by the original cutting. Instead of growing fastigiately these branchlets spread horizontally; instead of having alternate they had opposite leaves, slightly smaller and distinctly more cuneate at the base than the others, with moreover only a faintly red petiole and base of mid-rib, whereas the alternate leaves had red petioles, mid-ribs red throughout, and reddish secondary nerves beneath. The following season the set of leaves corresponding to the next succeeding season of growth in turn gave out more horizontal opposite-leaves branchlets, while the horizontal branchlets of the preceding season increased in length. It was observed, however, that these branchlets were now unlike the fastigiate and alternate-leaved branches in other respects. Instead of being decidedly thicker at their bases and tapering upwards like the latter, the opposite-leaved horizontal branchlets remained of uniform thickness throughout; they were moreover rather markedly swollen at the nodes, which is not the case with the alternate-leaved branches; most marked difference, perhaps, of all, the redness of the youngest part of the shoot, instead of deepening with age into a rusty brown, as happens with the alternate-leaved branches, passed in these opposite-leaved branchlets first into green and ultimately into greyish white. After an interval of two more seasons a striking occurrence took place. Just above the oldest set of horizontal branchlets, now in their fourth season of growth, a new series of buds appeared which developed into a new set of branches, so that now in each axil were to be found two superposed axillary twigs. But every one of these new and accessory branches differed from the first from its subjacent opposite-leaved companion branchlet in having dark-red bark, with alternate and red-veined leaves, in being thicker at the base than it is above, and in growing fastigiately instead of spreading horizontally. This second set of branches was in fact a repetition of the system of branches that appeared originally in the cuttings.

Since then the same phenomena have repeated themselves, the branches last described have developed their own primary series of horizontal branchlets and are now beginning to emit their accessory series of fastigiate branches. Moreover, the primary horizontal branchlets of the second series are now in full flower and are setting fruits.

While the cycle described is the normal sequence of events it must not be supposed that it exhibits absolute regularity. To begin with, every leaf on a vertical alternate-leaved branch does not have a horizontal, opposite-leaved branchlet in its axil; most of them have, but not all. Again, by no means does every branchlet with opposite leaves become accompanied by a superposed vertical alternate-leaved branch. Not infrequently these opposite-leaved branchlets die and are shed before the corresponding vertical alternate-leaved branch has appeared. The buds of these alternate-leaved vertical branches, in spite of their greater vigour of growth when they do ultimately burst, often never show at all or lie long latent, and appear low down on the stem, long after the leaves and the horizontal branchlets that correspond have disappeared. But where a vertical alternate-leaved branch does thus break, it is at once evident that just below its position there have formerly been a horizontal branchlet and a leaf. Again, though it is usual for only one vertical branch to accompany a horizontal branchlet, now and then two or even more than two branches arise at the same point. What, however, is certain in the case of *Qát* is that there are two branching moods and that these moods alternate. Leafy branches of deliquescent type with alternate leaves bear first a set of axillary branchlets of excurrent type with opposite leaves. The latter are comparatively short-lived and do not again branch vegetatively but ultimately bear in their axils cymes of flowers. Later, the leafy alternate-leaved erect branches produce just above the branchlets, a new series of branches which repeat the erect habit and the alternate leaves of the branches that bear them and in turn go through the same cycle.

The facts of the case explain all the divergent accounts of the authors who have been cited. In Herbaria only flowering or fruiting specimens as a rule find a place, hence as a rule only opposite-leaved twigs occur in collections. This explains the statements of Hochstetter and of the *Genera Plantarum*. The writers who say "leaves opposite or alternate" are more accurate no doubt, but, they leave the true condition entirely unexplained. In the case of Lindley's figure it can only be supposed that his artist had twigs of both kinds before him, and not grasping the significance of their differences had, to save space, combined their attributes. Loesener is much more nearly exact, and when he says "leaves on sterile branches often alternate," he is no doubt accurate, since all the opposite-leaved branchlets do not have flowers. He does not, however, bring out the fact that the branchlets with opposite leaves, so far as we know, are the only ones that ever do bear flowers and fruits. Forskael's account, in the light of actual facts, now becomes clear. His large branches are the branches of the alternate-leaved deliquescent type; his green branchlets are those of the opposite-leaved excurrent type. The expression 'articulate' is not strictly accurate; these branchlets are swollen at the nodes, it is true, but they are not jointed; nor is he accurate when he speaks of them as annual, for though they do appear as a new crop each year, and though they are short-lived as compared with the erect branches, they persist, as a rule, for more than one season. Some of them, in the case of a plant under observation at the Royal Botanic Garden, have persisted for 5 or 6 years. But when a branch of the erect alternate-leaved type appeares just above a branchlet of the opposite-leaved type, it grows so much more vigorously and rapidly than its companion that it seems to rob the latter of its nourishment, with the result that all save the leaves of its newest growth drop off and in a year or two it makes no more growth, loses the remaining leaves, dies, and sooner or later snaps off close to the branch from which it originated.

In what has gone before, the writer has endeavoured to bring together all that has been recorded, and to state what he has been able to observe, with regard to *Qát*. There are, however, not a few points that are still obscure; these it may be well to briefly review.

It has been explained that the writer has failed to get cuttings from the opposite-leaved branchlets to hold. It would be interesting to try, in some locality more suitable to the plant than the Gangetic delta, whether this experience holds good elsewhere, and whether it is only from branches of the alternate-leaved type that cuttings can be struck. Again, in cuttings from branches with alternate leaves, it was found that the buds which broke were all buds that gave rise to branches with erect habit and alternate leaves. They were supposed by the writer to be axillary; he now knows that they were really supra-axillary, and that in theory, a bud of the excurrent opposite-leaved type must have existed below each, but never became developed. No seeds have yet been obtained at Calcutta; those who have seeds at their command might observe what happens with seedlings, and record whether the first series of branches that appear on these are of the normal primary excurrent type, or whether with seedlings, as with cuttings, the first series of primary excurrent opposite-leaved branchlets is suppressed.

Then as to the name. Some writers give Qáf or Káf (*Bové*), Kafta (*Treasury of Botany*), or Cafter (*Watt*). In the *Gardeners' Chronicle* for 1843, Lindley publishes the explanation suggested by a scholarly friend that the varient *Káf* for *Kát* is merely a mistransliteration. It very probably is, but the point has not yet been authoritatively settled. Nor, to come to the scientific nomenclature, is it certain that *Catha edulis* is the correct appelation; whatever the name may be the authority universally cited for it is erroneous.

Then, is the plant wild in Arabia? Botta, we have seen, speaks of the plant as wild in Yemen. The matter is doubtful. The question whether *Coffee* is or is not wild in Arabia is one that every traveller in the Peninsula hopes to settle. The two matters hang together, and as the two plants are cultivated side by side, both problems will doubtless receive the same attention.

That the reputation the plant enjoys as a plague-preventive is an item of folk-lore and no more, is sufficiently clear from what Forskael says, but do the fresh leaves, as Botta states, ever have intoxicant qualities? As the property is associated especially with the leaves of wild plants, the absence of the property from the leaves of plants grown at Calcutta proves nothing. But the statement gives an added interest to the question whether the *Qát* is truly wild in

Arabia, whence the property is reported; its accuracy should admit of being readily tested in Abyssinia, where the species is unquestionably wild. That the ordinary commercial *Qât* is not deemed intoxicant, seems fairly clear from the statement made in the *Treasury of Botany* that certain Arabs were induced to assumes towards the species the attitude that the Wahabi sect assume towards *Tobacco* and, on account of its stimulant property, to class *Qât* among those intoxicants whose use is forbidden by the Koran. A synod consequently was convened to consider the point, and after due deliberation, having regard to the fact that it only caused hilarity and conduced to good humour, but neither impaired health nor interfered with attention to the duties of religion, this synod decreed that the use of *Qât* is lawful.

Forskael, as we have seen, gently throws a doubt on the potency claimed for *Qât* by the Arabs; Lindley (*Gardeners' Chronicle* 1843), says :—"We have tried the quality of the infusion in hot water, but are unable to say anything in its favour." Were the writer to judge from the results of his own trials, he must consider the stimulant properties even of fresh leaves just as doubtful as their narcotic ones. Possibly, however, Forskael, Lindley, and the writer, have not gone on long enough!

The *Qât mubarreh* or "inferior" *Qât* of the *Gardeners' Chronicle* is clearly the leaves of alternate-leaved three-year-old young stems, but whether the young shoots gathered in the fourth year are alternate-leaved branches or opposite-leaved branchlets we do not know. Theoretically we should expect them to be the latter; we know, however, that with cuttings the opposite-leaved branchlets remain suppressed and alternate-leaved branches at once arise, and it may be that with seedlings this is also the case. Anyhow the matter, which might be settled by a simple observation in Abyssinia or Arabia, has never received the attention it demands. That the two kinds of *Qât*, the "red" and the "white," referred to by Lindley's Abyssinian correspondent, are simply twigs from young alternate-leavedand from opposite-leaved shoots, respectively, will be obvious to those who have studied the branch-system of the plant. Unfortunately our certainty as to this throws no light on the problem as to whether good *Qât* has leaves opposite or alternate, because no reference has been made to the relative quality of the "red" and the "white" kinds.

DeCandolle remarks on the fact that the use of *Qât* has not spread eastward to Beluchistan and India, where intoxicants are so much in request, in spite of the fact that the plant is likely to thrive well enough in both countries. The first question of course is as to whether *Qât* be really an intoxicant at all. Apart from this, however, a sufficient reason possibly is that the people of those parts of Beluchistan, Persia or India, where *Qât* will freely grow, did not require to trouble about so relatively innocent an article when they had at hand such potent intoxicants in *Hyoscyamus*, *Cannabis* and the like.

The *Gardeners' Chronicle* for 1890 speaks of *Qât* as a plant that it might be advisable to introduce into various British Colonies and Dependencies. In the writer's opinion *Qât* is a plant that deserves further investigation, but something more definite than we have yet been told must be known before its introduction, as other than a curiosity, need be advocated.

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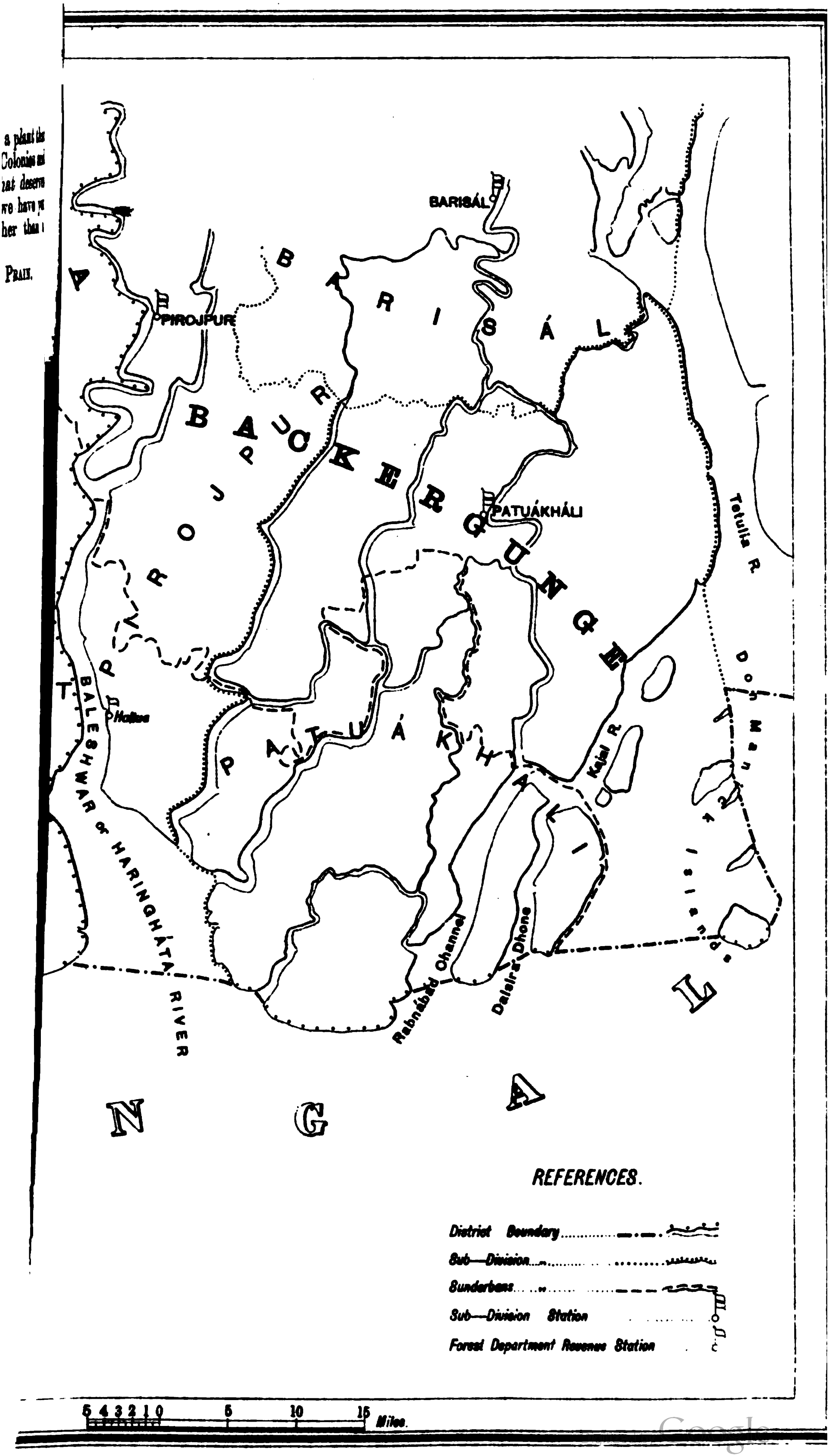

Photo. S. I. O., Calcutta.

FLORA OF THE SUNDRIBUNS.

◆

By D. Prain.

◆

I.—INTRODUCTION.

The investigation of the flora of the Sundribuns has occupied the attention of the officers in charge of the Royal Botanic Garden since 1796, when Dr. Roxburgh,* through his friends Dr. William Carey of Serampur and Dr. Buchanan-Hamilton,† received from this region a number of very interesting plants. The assiduity and success with which the investigation of the Sundribuns was conducted by Roxburgh may be gathered from an examination of the *Hortus Bengalensis* published in 1814; one finds there recorded from the Sundribuns several species, such as *Flemingia congesta*, *Mesoneuron cucullatum*, *Bruguiera parviflora*, *Arthrocnemum indicum*, *Salicornia brachiata*, *Dendrobium Pierardi*, *Pteris vittata*, that have not been collected in the area since his day. The indiscriminate liberality with which the specimens collected during the first half-century of the garden's history were distributed by Dr. Wallich‡ has deprived the Calcutta collection of Roxburgh's specimens, so that all of the species enumerated have to be looked for anew in order that Roxburgh's records may be confirmed. Wallich does not himself appear to have given particular attention to the Sundribun flora though among the Wallichian specimens are examples of an interesting plant§ obtained by him from this area in 1817 that no one has found there again. Dr. Griffith, who acted as Superintendent during the absence of Wallich, himself collected in the Sundribuns, and a few of his specimens from the region are present at Calcutta. Dr. Falconer,* who succeeded Wallich, next took the matter up and the collections obtained from the Sundribuns during his incumbency include *Cyamopsis psoraloides*, *Acacia Intsia*, *Asphodelus tenuifolius*, which have not been recorded since. Dr. Thomson † who followed Falconer, also made extensive Sundribun collections which include, among plants not recorded before or since his time, *Allophylus Cobbe*, *Acacia tomentosa*, *A. concinna*, *Vitex trifolia*. Dr. Anderson, ‡ the next Superintendent, did not himself collect in the Sundribuns but Mr. Kurz, § during Anderson's incumbency, made several collections in the area; the only species obtained by him that has not been collected since is *Aldrovanda vesiculosa*, a species already known to Roxburgh and to Thomson as a native of the Bengal plain immediately to the north of the Sundribuns. Mr. Clarke,‖ who followed Anderson, has given particular attention to the Sundribun flora, his collections include the following species not obtained since his visits to the region:—*Merremia hederacea*, *Coldenia procumbens*, *Teramnus flexilis*, *Lantana triflora*, *Scirpus triqueter* var. *segregata*, *Cladium riparium* var. *crassa*. Sir G. King ¶ kept up the traditional interest of the Calcutta Garden in the flora of the Sundribuns and with the assistance of various friends, but more especially of Mr. Gamble, added considerably to the list of Sundribun species; first, and in two cases only, records dating from the period 1871—1878 include *Mallotus repanda*, *Petunga Roxburghii* *Bridelia stipularis*, *Desmodium umbellatum*.

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* Superintendent, 1793—1814.

† Superintendent, 1814—1816.

‡ Superintendent, 1817—1845.

§ Hibiscus tortuosus *Wall.* (not *H. tortuosus* Roxb., which is only *H. tiliaceus* Linn.), of which original examples are present in the Calcutta Herbarium; there are also living plants, introduced by Wallich, in cultivation still in the Calcutta Garden.

Shortly after 1880, Mr. Ellis, then Deputy Conservator of the Sundribun Forests, sent to Calcutta some collections of Sundribun plants, the most interesting of these being *Orysa coarctata*, regarding which, in spite of Roxburgh's very definite account of its appearance and habitat, some misconception had arisen, and *Kleinhovia hospita* which had never been obtained in the Sundribuns before and has not been again reported. These Sundribun plants sent by Ellis were added by Mr. Brace** to a special local Sundribun collection already formed by King between 1871—1880. The knowledge of the Sundribun flora afforded by the material thus accumulated was considerable, but it was recognised that it must be far from complete. How incomplete it was became apparent when Mr. Heinig was posted to the Sundribuns as Deputy Conservator of Forests ten years later. His duties included the preparation of a working-plan of the Sundribun Forest Reserves; in connection with this duty Heinig sent collections of the important Sundribun species to the Calcutta Herbarium for identification by Sir G. King and by the writer, then Curator of the Herbarium. These collections, though formed with a special and technical object, proved so interesting from the scientific point of view that we begged Heinig to continue his investigations. With this request Heinig complied, and to his collections, carefully made during four or five seasons from 1891 to 1894, is largely due the fact that our knowledge of the Sundribun flora is now perhaps as complete as our knowledge of the Bengal rice-plain itself. During one of Heinig's tours he was accompanied by Mr. G. A. Gammie,* whose enthusiasm as a collector is well-known.

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* Superintendent, 1845—1855.
† Superintendent, 1855—1861.
‡ Superintendent, 1861—1870.
§ Curator of the Herbarium, 1864—1878.
‖ Officiating Superintendent, 1869—1871.
¶ Superintendent, 1871—1897.
** Curator of the Herbarium, 1881—1886.

Heinig's interest in the Flora of the Sundribun forests led to his preparing an account of the topography of the Sundribuns and a sketch of the vegetation of their forests; these were incorporated in the working-plan alluded to above. To this Heinig added, as an appendix, based partly on the specimens of his earlier collections, depending partly on collation, a "List of the Trees, Shrubs and Large Climbers" of the Reserved and the Protected Sundribun Forests. The topographical and descriptive portions of Heinig's account have been largely drawn upon in the chapters that follow. The list appended to the working-plan, though important as a contribution to applied Botany, is less valuable from a scientific point of view. Having regard to the purpose of his report as a whole, Heinig's attention was of necessity chiefly given to such species as are of importance from the Forest Officer's stand-point. Its greatest drawback is, however, its inaccessibility. Heinig has also published an interesting account of the root-system of various species characteristic of the Sundri-forests, as apart from the Mangrove-forests, to which allusion will be made in a subsequent chapter.

A few years later Mr. C. B. Clarke, whose personal knowledge of the Sundribuns is also very intimate, provided an excellent account of the topography and vegetation of the Sundribuns. Clarke's sketch of the region took the form of a Presidential address, delivered at the Anniversary meeting of the Linnean Society of London in 1895, and subsequently published in the Society's Proceedings. This second account of the Sundribun flora possesses a double advantage over that of Heinig. In the first place it deals not only with the western and central Sundribuns which are under swamp-forest, but with the savannah-swamps of the eastern Sundribuns, a region regarding which we owe to Clarke practically all the knowledge that we possess. Moreover, Clarke's account of the region is readily accessible; that of Heinig forms part of an unprocurable official document. Clarke's paper, however, shares with Heinig's the disadvantage of presenting a list that, though with a different object and in a different manner, is also a selective list. Its purpose cannot be better put than it has been by Clarke himself, who writes:—"This list, containing 69 species, is of course only a portion, perhaps not one-sixth, of the plants which may be collected wild in the Soondrebun. I draw up this list to include those species which I can collect in the Soondrebun, but cannot collect in the Bengal Plain for 100 miles outside the Soondrebun." Clarke's selective list serves the purpose for which it is intended as admirably as does that of Heinig. Both, however,—indeed the two taken together,—fail to provide a complete census of Sundribun plants.

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* Professor of Botany, College of Science, Poona, then officiating as Curator of the Calcutta Herbarium.

The present paper is the immediate outcome of a visit that the writer, thanks to the kindness of Mr. Lace, Conservator of Forests, Bengal, was able to pay to the Sundribuns during August 1902. An endeavour is here made to convey some idea of the topography of the region, of the nature of the vegetation, and of the origin of the characteristic flora. At the same time the opportunity is taken to provide a census, as complete as the material hitherto available will permit, of Sundribun species. Having regard to the special needs of Forest Officers, to whose efforts, as has been explained, our knowledge of the botany of the region is so largely due, points of economic importance are noted in connection with particular species; a guide to the genera, which it is hoped may be an aid in the identification of these Sundribun plants, precedes this census.

The map accompanying this sketch, which may be usefully consulted in connection with the chapter that follows, and in studying the census of Sundribun species with which the paper concludes, is a reduction from that of Ellison, published in 1873.

II.—TOPOGRAPHY OF THE SUNDRIBUNS.

The region known as the Sundribuns forms the southern part of the Gangetic delta between the Hughli on the west and the Megna on the east. The included area consists of a number of low-lying swampy islands formed by the principal distributaries of the Ganges and their connecting water-channels and creeks. Along the northern border and particularly at the western end there is a certain amount of clearing and cultivation continuous with the cultivated ground of Central Bengal; in the eastern section of the area, between the Madumati and the Megna, cultivation and clearings extend almost to the sea-face. The central and western portions, except for the gradually extending but still comparatively insignificant amount of cultivated ground along their northern fringe, are occupied by extensive forests; those of the central section, between the Madumati (known within the Sundribun area as the Baleswar) and the Raimangal, being Reserved Forests; those of the western section, between the Raimangal and the Hughli are merely Protected Forests. These three very distinct sections form, from west to east, the southern portions of the districts of the 24-Perganahs, Khulna, and Backerganj, respectively.

The courses and relative position of the Hughli and the Megna are well known to residents of Bengal or, if not familiar, are easily traceable on the map; they need not therefore be described here. The intervening rivers are, however, less familiar; for this reason and also because it is only by forming some impression of the entangled nature of their courses and intercommunications that an adequate idea of the Sundribuns is to be obtained, a brief sketch of their ramifications is here given.*

The *Hughli*, though it forms the western boundary of our area, is not really a member of the Sundribun river-system, and is only incidentally connected with it owing to its giving off at Mud Point an eastern branch known as the Muriganga or the Awatola river which flows southward on the east side of Saugor Island to reach the sea at Dhobelát Island. The first Sundribun river of importance, as we pass eastward from the Hughli, is the *Sabtamúkhi*. This originates near Sultanpur and reaches the sea after a winding course of 50 miles. It is connected with the Muriganga branch of the Hughli by the Gagúdanga Gang and by the Doágra Khal.

The *Thákúrán*, which originates near Jainagar, has also a southerly but less tortuous course of 50 miles before reaching the sea. It increases rapidly in volume on the way and near its mouth is known as the Halúra or Jamerá river. Various khals connect it with the Sabtamúkhi, the principal being the Maral Gang and the Kumária.

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* The details of this sketch of the Sundribun river-system are taken from the fuller account of the topography of the region by Heinig, to which it will be necessary to make frequent references in the pages that follow.

Through the Kúltolla Nadi and the Piáli Nadi it is connected with the Calcutta canals.

The *Mátla* is formed close to Canning Town by the junction of the Bidhyadari, the Khuratya, and the Rampura khals. From its point of origin it flows 60 miles to the sea. It is the largest and deepest of the Sundribun streams, being an arm of the sea rather than a river, navigable throughout its course by ocean-going vessels. With the Calcutta canals the Mátla is connected by the Piáli Nadi and the Bidhyadari; with the rivers and channels to the east it is connected by the Rampura Khal and by the Bidda with its many affluents and effluents.

The *Guasábá*, which originates in the net-work of minor channels that lie between the upper reaches of the Raimangal and the Mátla, is the next important stream to the east. It has a course of about 45 miles before reaching the sea; with the Mátla it is directly connected by the Netadupáni.

The *Raimangal*, which separates the district of the 24-Perganahs from that of Khulna and at the same time divides the Protected Forests from the Reserved Forests, has a course of 50 miles from Sahebkhali to the sea. It is connected with the Rampura Khal by the Bárákálágáchya; with the Guasábá by the Terá Banka and the Hari Bhánga; with the Jabúna, the next considerable river to the east, by several streams of which the principal are the Barakúlia, the Kalindi Nadi and the Atthára Banka.

These western Sundribun rivers are not in any instance immediate distributaries of the Ganges; they more resemble long arms of the sea than rivers; they are subject to tidal influence throughout their course, and their waters are consequently more saline than those of the rivers in the central and eastern Sundribuns. The effect of all this is distinctly reflected in the character of the vegetation.

Passing eastward from the Raimangal the next main-river is the *Jabúna* which begins at Kishenganj and after a course of 200 miles joins the Raimangal shortly before the latter reaches the sea. The *Isamati*, soon changing its name to the Molingchu, is the next considerable stream. It begins near Halderkhali and after a course of 50 miles through the Satkhira forest, which constitutes the western half of the central Sundribuns, joins the Barápúnga near the sea-face. The Molingchu and the Jabúna are directly connected by the Fringi, the Aburi, and various other khals.

The *Arpangassia*, formed by the junction, near Burigoálni, of the Kalpatta and the Kobaduc rivers, flows southward for about 40 miles between the Satkhira forest and the forests of the Khulna Reserves.

In its lower reaches this river is known as the Barápúnga; it is joined by the Molingchu just before reaching the sea and is connected with that river further to the north by the Arabibanki, the Golapatti, and various other streams.

Next after the Arpangassia comes the *Sipsa*, a river which originates at Deluti from the union of a number of khals derived from the Kobaduc on the west and from the Bhadder on the east. After a course of 40 miles it distributes itself as the Mandabári, the Moazál, and the Hondurás rivers. These three again unite to form one stream known as the Múrjhata. This Sipsa river-system is connected with the Arpangassia by the Hansurá, the Batlagang and various other channels. The *Bhadder* leaves the Kobaduc at Jhinárgách near Jessore, enters the forest reserves at the northern end of Sútarkháli and from this point has a course of 25 miles before it is merged in the Sipsa.

The *Pussur*, the next important river, is an effluent of the Bhyrah at Khulna; from this point it flows 85 miles to the sea. It is connected with the Bhadder by the Chunkori, the Bajna, the Daodobe, the Laula, the Barájongana, the Bori, the Arpangassia,* and the Mángi khals; with the Sipsa it is connected by the Cháila Bogi river. About 20 miles from its mouth the Pussur gives off a considerable river, the Bángárá; this last takes a more direct course, of 16 miles, to the sea, receiving on the way the Kágá, the Baráshiála and the Shella rivers. A perfect net-work of rivers and khals connect these tributaries of the Bángárá with the Pussur on the west and the Bhola on the east; the chief of these are the Khúrma, the Chachan-Gang, the Andramoni, the Mrigyanáli, the Shellagang, the Aria Banki, the Char Nangáli, the Pankassia, the Harintáná, the Ghosiángu, the Putia, the Kátá, the Bentmori, the Chandésar.

The *Bhola*, the next main-stream, which begins as a distinct river near Rámpúl, is connected on the north by means of a net-work of khals with the Bhyrah and the Baleswar rivers. After flowing for 40 miles it joins the Pankassia near the junction of that river with the Haringhátá.

The *Baleswar*, the next great river, is a direct effluent of the Ganges, the main-stream of which it leaves near Pabna. In the northern part of its course it is known as the Madumati. From Bogi Khal southward it forms the eastern boundary of the reserved forests and separates the district of Khulna from that of Backerganj. In its lower reaches the Baleswar widens considerably and is termed the

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* Not to be confounded with the *River* Arpangassia.

Haringhâta. With the Bhola on the west it is connected by the Jeodhâra, the Chipa Bâri, the Daunsâgar, the Saronkhola, the Sâpala; its eastern effluents or affluents, permeating the eastern Sundribuns, are the Kocha, the Haltua, the Bishkhali.

These rivers of the central and eastern Sundribuns, being directly connected with the Ganges, bring down an enormous volume of fresh water, especially during the rains. Their streams are thus less brackish than those of the western rivers, and the character of the vegetation in these divisions of the Sundribuns is thus markedly affected.

The area of this region of interlacing rivers and creeks is about 7,000 square miles; the various water-channels constitute almost one-fourth of the whole, the remaining three-fourths being composed of the low-lying swampy islands which these channels surround. These islands in the eastern or Backerganj Sundribuns are, where not cleared for cultivation, largely occupied by grassy or sedgy savannahs; in the western and central Sundribuns they are mainly forest-clad. The islands are, as a rule, rather higher along the river-banks than they are elsewhere, with somewhat lower and more swampy land inside; as the banks at intervals are cut, and the whole of the interior penetrated and permeated by numberless small creeks, the entire surface of the soil, during the rains and when the rivers are full, is practically under water at every high tide. At low-water during the same season the whole surface is a sheet of somewhat adhesive mud interspersed with shallow pools of standing water. During the cold-season, when the body of water in the rivers is smaller, many of the islands become quite dry, and the superficial mud, which is soft and adhesive when wet, hardens and cakes and cracks on the surface.

This mud is composed of a rather tenacious loam, mixed with a certain proportion of fine sand; the whole, owing to the presence of much humus, is of a bluish-grey tint. The surface of this mud has everywhere a thin coating of river-slime. Near and at the sea-face this mud is at times continued under the lowest tide-level; at times, owing to the action of the waves the slime entirely, and the humus and loam largely, disappear, only the fine sand remaining. The subsoil, as seen at low tide along steep river-banks where erosion is in progress, is also loamy, with here and there patches of almost pure sand—vestiges usually of old sand-banks and river-churs, though doubtless sometimes the remains of a former sea face. Less often smaller pockets of a darker and more tenacious loam, approaching in appearance and consistence though not in composition to a clay, are interspersed among these sandy patches. This subsoil extends, as borings in the Gangetic delta show, to a depth of 120 feet, where it rests on a fairly uniform layer of semi-fluid mud 40 feet in thickness, which is succeeded by a formation of the same character as that which overlies it.

The heavy flow of water in the larger channels that marks the rainy season frequently causes the erosion of the bank against which a current sets. Banks are thus at times washed bodily away; more frequently, however, the root-system of the riparian vegetation holds the actual bank in position and the current only undermines it. When the waters fall to a lower level in the cold weather, such banks, deprived of the support supplied by the pressure of the water, often subside bodily into the stream, with the vegetation growing upon them still intact. The submersion to which the trees are subjected during the higher tides of the subsequent monsoon suffices to kill them, but does not necessarily effect their removal, and the obstruction they now offer to the flow of the stream is apt again to alter the set of the current and to lead to a similar attack by the river on another part of its bank. Where erosion of this kind takes place there is not infrequently a coincident and compensating accretion of shelving muddy bank on the opposite and convex side of the river-reach.

Such newly formed banks become covered with grass which serves to bind the mud already deposited and helps to arrest silt and floating seeds. The latter germinate freely and lead to an extension of the forest over the newly formed land. The peculiar root-systems of many of the resulting species help still further to bind the soil and, by arresting more and more silt, to raise the general level of the bank.

The strong storms from the north-west, so prevalent in the Bengal plain from March till May, and the cyclones that occasionally sweep up from the sea of Bengal at the commencement and the close of the south-west monsoon, do considerable damage to the forests by overturning the taller trees, which break those that check their fall. The trees along the coast-line are, moreover, markedly affected by the steady monsoon winds that blow for half the year; they have in consequence a gnarled and bent and stunted habit of growth.

Throughout much of the western Sundribuns, except in the most northerly islands, the vegetation is largely of the mangrove type though even here the mangroves (*Rhizophoraceæ*) are accompanied by Géngwa (*Excoecaria Agallocha*), by Hiṭal (*Phœnix paludosa*) and by Sátári (*Ægialitis annulata*). In the southern islands of the central Sundribuns, where the influence of the tides is strong, the predominance of the mangroves is equally marked. Throughout the rest of the central Sundribuns and in the northern islands of the western Sundribuns the predominant species is Sundri (*Heritiera minor*)—a circumstance to which the region owes its name of Sundribuns. Associated with Sundri are several characteristic species, notably Amúr (*Amoora cucullata*), Pussur and Dhundol (two species of *Carapa*) and Báen (*Avicennia*), while the river-banks are fringed with various species, the most notable being the Keora (*Sonneratia apetala*). Along the banks too climbing species are most in evidence. Except along the northern borders of the forests, these islands, whether of the Sundri or of the Mangrove class, are remarkably free from dense undergrowth. The savannahs of the eastern Sundribuns are largely composed of Nál (*Phragmites Karka*) though with this are associated several other grasses and a number of tall sedges. Clearings of considerable extent exist throughout the whole of the eastern Sundribuns; in the central and western Sundribuns these are confined to the northern border of the forests. Besides these existing and slowly but steadily advancing clearings there are traces within the forests, and further to the south than any existing cultivation, of former settlements. These vestiges of abandoned occupation, marking perhaps the dwelling-places of salt-makers and Sundribun pirates, are seen in mounds or platforms of higher ground such as may be met with on the left bank of the Mandabari river, not far from Kobaduc, where there are old ruins; another place of the same kind is to be found at Jatta where there are the ruins of an old Hindu temple. The forest in places of this kind is interesting as containing some species, such as the Báel (*Ægle Marmelos*), the Uriám (*Bouea burmanica*), the Gáb (*Diospyros Embryopteris*), the Amaltás (*Cassia Fistula*), that apparently do not occur and possibly could not exist in the swamp-forests; in all probability some of them have, in the first instance, been intentionally introduced.

III.—NATURE OF THE VEGETATION.

When the vegetation of the Sundribuns is considered in more detail, it is convenient at the outset to separate the clearings, whether existing or abandoned, from the swamp-forests. It is true that in the clearings, especially along embankments and on the banks of creeks and khals, a number of the species characteristic of the swamp-forests still persist. Some of them, like *Pluchea indica*, *Pandanus fascicularis*, *Tamarix gallica*, *Flagellaria indica*, *Dalbergia spinosa*, *Clerodendron inerme*, *Premna integrifolia*, *Suæda maritima*, *Acrostichum aureum* are actually more plentiful and luxuriant than they ever appear to be in the forests proper. Moreover, there are some truly maritime species, such as *Phaseolus adenanthus*, *Stictocardia tiliæfolia*, *Agyneia bacciformis*, *Blumea amplectens* var. *maritima*, *Sphæranthus africanus*, *Azima tetracantha*, *Solanum trilobatum*, *Psilotrichum ferrugineum*, *Cyperus scariosus*, *Fimbristylis polytrichoides* var. *halophila*, *Paspalum distichum*, which are plentiful in the clearings but which one cannot find either in the Sundri or in the Mangrove-forests. A few other species, like *Sesuvium Portulacastrum*, *Zoysia pungens*, *Pycreus polystachyus* occur both in the clearings and at the sea-face. The bulk of the species to be met with in the northern clearings are, however, as will be seen on examining the list of Sundribun plants, either species deliberately introduced by man, or weeds such as accompany his crops, appear in the ponds or ditches that he excavates, or spring up by the sides of his paths and on his rubbish-heaps. The mounds and platforms of higher ground within the forests that mark old settlements, supply a number of species that indicate persistence under favourable conditions, on the sites of abandoned clearings, of species possibly originally introduced. The ruins at Mandabari, examined by Heinig and Gammie, and other similar places where Heinig alone has collected, have yielded a considerable number of species of this class. Having regard to the interest of this question the writer took occasion, when visiting the ruins at Jatta in August 1902, to collect every species that was to be found there; this collection supplies several additions to the list, which includes † *Cratæva Roxburghii*, *Flacourtia sepiaria*, * *Ægle Marmelos*, * *Zizyphus Œnoplia*, † *Eugenia fruticosa*, *Cassia Fistula*, * *Abrus precatorius*, † *Vangueria spinosa*, † *Ixora coccinea* var. *Bandhuca*, *Diospyros Embryopteris*, * *Diospyros montana*, † *Cordia Myxa*, * *Ocimum sanctum*, * *Antidesma Ghæsembilla*, † *Bouea burmanica*, * *Zingiber Casumunar*, *Croton oblongifolius*, *Odina Wodier*. The species in this list marked with an * have been found so far only at Jatta on the mound where there are the remains of a Hindu Temple; those marked with a † have been collected only at Mandabari, or at places of the kind other than Jatta. The remainder, without any distinguishing mark, are common to Jatta and to other ruins. Only one of these species, *Odina Wodier*, has been found in the swamp-forests proper and even there its only locality was a small (and now unused) wood-cutter's camping-ground on the bank of the Ambaria Khal.

The small patch of forest at Jatta on the temple platform and among the ruins yielded the following species in addition to those indicated in the foregoing list:—*Cleome viscosa*, *Tinospora tomentosa*, *Atylosia scarabaeoides*, *Trichosanthes palmata*, *Luffa graveolens*, *Momordica dioica*, *Limnophila gratissima* (from the small sweet-water temple-tank), *Anisomeles ovata*, *Acalypha indica*, *Trema orientalis*, *Ficus religiosa*, *Ficus infectoria*, *Dioscorea pentaphylla*, *Commelina bengalensis*, *Kyllinga triceps*, *Fimbristylis monostachya*, *Panicum colonum*, *Panicum prostratum*, *Setaria glauca*, and (on the walls) *Adiantum lunulatum*. All of the species here enumerated are plants charactersitic of village-shrubberies, hedges and waste-places in the Bengal plain. Except *Luffa graveolens*, which is plentiful in the Upper Gangetic plain, but for which this would appear to be the first record from the deltaic alluvium, all of them are to be found in the districts of the 24-Perganahs and Khulna outside the Sundribuns. Yet none of them have been found anywhere else within the Sundribuns. Their presence in such a spot as the Jatta platform affords evidence of the power possessed by species of this kind, probably mostly casually introduced while the locality was actually occupied, to persist under favourable conditions. Nor could conditions more favourable be readily conceived. The slight degree of artificial elevation given to the site of this old temple, augmented by a further elevation due to the crumbling of the walls of the temple courtyard,* provides a foothold for these species whereon the conditions to which they are accustomed in the Bengal plain are exactly reproduced. Moreover, the tiny platform is separated by many leagues of low swampy land, suitable only for the species characteristic of the Sundri-forests, from the nearest spot on which competing species can well exist and whence invading forms could readily come. If the conditions afforded by the higher and drier ground of the platform are so sharply contrasted with those of the immediate environment as to prevent surprise that these platform plants have not invaded the swamp-forests, this contrast equally explains why the species of the swamp-forests show just as little tendency to overrun the platform. The surrounding forest, therefore, in place of entering into competition with the species to be met with on the artificially raised mounds that indicate abandoned settlements, affords in reality the best safeguard, to such plants as have already become established there, against outside competition.

The extent to which this is the case is better appreciated when the number of species that are common to the Jatta platform and to (*a*) other clearings, (*b*) the sea-face, and (*c*) the swamp-forests is considered. With other similar mounds or platforms within the limits of the Sundribuns the Jatta one shares only *Glycosmis pentaphylla* and *Breynia rhamnoides*. Species of this class that have been recorded from other places of the same kind but that are not present at Jatta are also few in number:—*Aphania Danura Zehneria umbellata, Clerodendron Siphononthus, Bridelia stipularis*, and *Streblus asper* probably exhaust the list. The shortness of this roll, as compared with that of species possibly intentionally introduced, is noteworthy. With existing clearings the Jatta platform shares only *Vitis trifolia, Crotalaria verrucosa, Vernonia cinerea, Hygrophila phlomoides, Pistia stratiotes, Paspalum scrobiculatum*. At the sea-face only four species found at Jatta have been collected; these are *Crotalaria verrucosa, Capparis sepiaria, Ficus Rumphii, Derris scandens*. Only three species, and all of them climbers, are common to the Jatta platform and the swamp-forests; these are *Vitis trifolia* and *Vitis latifolia*, the former common, the latter rare, on river-banks only; and *Derris scandens*, common everywhere throughout the forests from the northern boundary to the sea-face.

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* Jatta Pagoda itself is more or less intact and forms a landmark in the navigation of the khals and creeks in its vicinity.

Besides those species that are maritime or littoral, which occur in the existing clearings but which one does not find either in the swamp-forests or collect, as Mr. Clarke has put it, "in the Bengal Plain for 100 miles outside the Soondrebun," and in addition to the species which one finds in swamp-forests or at the sea-face but which appear to thrive better in the clearings than elsewhere, there are a number of others that persist in the clearings only along embankments and sides of creeks, but are not there more luxuriant than they are in the forests. As examples may be quoted *Canavalia turgida, Vigna luteola, Derris uliginosa, Pongamia glabra, Cæsalpinia Nuga, Sonneratia apetala, Morinda bracteata, Wedelia calendulacea, Wedelia scandens, Ægialitis annulata, Ægiceras majus, Sarcolobus globosus, Sarcolobus carinatus, Acanthus ilicifolius, Avicennia officinalis, Excoecaria Agallocha*. The majority of the species in existing clearings do not, however, occur in the swamp-forests at all. To a considerable extent they are aquatic species, found in sluggish ditches behind embankments raised to keep out the tides, and in pools or tanks of sweet or only slightly brackish water. The leading examples of submerged aquatics are *Ceratophyllum, Hydrilla, Lagarosiphon, Vallisneria, Ottelia, Ruppia, Naias*, two species of *Utricularia*; of floating water-plants *Pistia, Aldrovanda, Limnanthemum, Panicum Myurus* and *P. proliferum, Chamæraphis, Leersia, Ipomœa aquatica*. Other semi-aquatics, partially submerged or growing in very wet places, are *Hydrolea, Ammannia, Herpestis*, three species of *Hygrophila, Hemigraphis*, two species of *Scirpus*, several grasses, *Ceratopteris thalictroides*. Still another group of semi-aquatics or aquatics affect not pools or jhils or still ditches, but the edges of rivers, khals or creeks. Among these may be enumerated two species of *Typha*, *Alpinia Allughas*, *Scirpus grossus*, *Panicum repens* and, as a species wholly submerged at every high tide, *Cryptocoryne ciliata*. The species of this group are sometimes to be found penetrating for a short distance into the northern forests, but none of them are truly swamp-forest plants.

Terrestrial species confined to existing clearings are plants either only in cultivation, or escapes from cultivation, or field-weeds. Among those cultivated or occurring as escapes we find *Gynandropsis pentaphylla*, * *Zizyphus Jujuba*, * *Cyamopsis psoraloides*, * *Sesbania grandiflora*, * *Tamarindus indica*, * *Parkinsonia aculeata*, * *Acacia arabica*, *Turnera ulmifolia*, *Trichosanthes cucumerina*, * *Psidium Guyava*, *Calotropis gigantea*, *Solanum argenteum*, *Angelonia grandiflora*, *Ocimum sanctum*, *Ocimum Basilicum*, * *Amarantus paniculatus*, * *Amarantus polygamus*, *Basella rubra*, *Casuarina equisetifolia*, * *Areca Catechu*, * *Cocos nucifera*, *Oryza sativa*, *Andropogon squarrosus*. The species marked * are only found planted; the others are species that have become thoroughly naturalised and in the case of two of these, *Solanum argenteum* and *Angelonia*, this does not appear to be the case anywhere else in India, though *Angelonia* has become similarly naturalised in places in the Irrawaddy delta and near the sea in Tenasserim.

The weeds to be met with in these clearings include *Senebiera pinnatifida*, *Abutilon indicum* and *A. graveolens*, *Malachra capitata*, *Corchorus acutangulus*, *Oxalis corniculata*, *Portulaca oleracea*, *Cardiospermum Halicacabum*, *Crotalaria verrucosa* and *C. Saltiana*, *Phaseolus trilobus*, *Cassia Tora*, *Cucumis trigonus*, *Cephalandra indica*, *Trianthema monogyna*, *Oldenlandia diffusa*, *Vernonia cinerea*, *Ageratum conyzoides*, *Grangea maderaspatana*, *Xanthium spinosum*, *Cnicus arvensis*, *Oxystelma esculentum*, *Dæmia extensa*, *Tylophora tenuis*, *Hoppea dichotoma*, *Coldenia procumbens*, *Ipomœa sepiaria*, *Solanum nigrum* and *S. xanthocarpum*, *Heliotropium indicum*, *Vandellia crustacea*, *Scoparia dulcis*, *Leucas linifolia*, *Amarantus viridis*, *Euphorbia hypericifolia*, *E. hirta* and *E. thymifolia*, *Phyllanthus Niruri*, *Chrozophora plicata*, *Asphodolus tenuifolius*, *Setaria verticillata*, *Andropogon aciculatus*, *Sporobolus tremulus*, *Chloris barbata*, *Eleusine indica* and *E. ægyptiaca*, *Diplachne fasca*, *Eragrostis tenella* var. *plumosa*, *Asplenium esculentum*, *Nephrodium aridum*, *Polypodium proliferum*. This is a meagre list when the area of these clearings is taken into account and may well be incomplete as regards some of the older clearings. The species themselves are, as a rule, unimportant, and the chief interest of the list lies in the indications it affords as to what species first extend into these newly opened settlements from the Bengal plain, for with only two exceptions these species are all common weeds in the rice-fields or the village shrubberies of Bengal. The exceptions are *Senebiera pinnatifida* and *Xanthium spinosum*, both plentiful weeds near the banks of the Mátla river which do not occur anywhere in the Bengal plain outside the Sundribuns, and both obviously recent introductions to India. It is worth noting, moreover, that among the first species to appear in the newest and smallest settlements are *Ageratum conyzoides* and *Scoparia dulcis*, neither of which is originally a native of India.

Turning now to the Sundribun species that occupy parts which probably have never been subjected to clearing, the first to be considered are those that occur along the sea-face where the line of low sand hills to be met with at various parts of the coast afford conditions very different from those that prevail on the muddy river-banks or in the swampy islands, and provide a foothold for a number of species characteristic of the littoral of South-Eastern Asia generally. The following list includes all that have hitherto been reported ; in all cases where the species occurs elsewhere in the Sundribuns this fact is noted :—

Naravelia zeylanica : also northern edge of forests.

Capparis sepiaria : also among ruins at Jatta.

Tamarix gallica : also river-banks throughout the forests and especially in the northern clearings.

Hibiscus tiliaceus : also general.

Thespesia populnea : planted in the northern clearings; not found in Sundri-forests.

Vitis trifolia : also general.

Allophylus Cobbe var. *glabra*.

Odina Wodier : planted in northern clearings, also on sites of old settlements and camping-grounds.

Crotalaria retusa.

Crotalaria verrucosa : also northern clearings and old sites.

Crotalaria Saltiana : also northern clearings.

Desmodium umbellatum : general, but rare.

Erythrina indica.

Canavalia lineata.

Vigna luteola : also river-banks generally.

Dalbergia torta : also general.

Derris scandens : also general.

Derris sinuata.

Cæsalpinia Bonducella : also northern clearings and edges of northern forests.

Cæsalpinia Nuga : also general.

Cassia Sophera.

Barringtonia racemosa : also general.

Sesuvium Portulacastrum : also river-banks.

Ixora parviflora.

Launea pinnatifida.

Ipomœa pes-capræ.

Ipomœa longiflora.

Ipomœa illustris: also river-banks.

Dolichandrone Rheedei: also general.

Acanthus ilicifolius: also general.

Lippia geminata: also clearings.

Vitex trifolia.

Vitex Negundo.

Clerodendron neriifolium.

Clerodendron inerme: also general.

Aristolochia indica.

Cassytha filiformis.

Trewia nudiflora: also in northern clearings, wild.

Ficus Rumphii: also on ruins at Jatta.

Crinum asiaticum : also general.

Aneilema nudiflorum.

Pycreus polystachyus : also in clearings.

Cyperus tegetiformis.

Mariscus albescens: occasional on river-banks but most plentiful at sea-face.

Fimbristylis ferruginea: also pretty general.

Fimbristylis sub-bispicata.

Oryza coarctata : also shelving muddy banks of all rivers.

Saccharum spontaneum : also savannahs.

Zoysia pungens: also pretty general.

Of the species here enumerated nearly 40 per cent. occur therefore in the Sundribuns only at the sea-face. More striking still, a considerable number of these species, such as *Crotalaria retusa*, *C. Saltiana* and *C. verrucosa*, *Cassia Sophera*, *Derris scandens*, *Naravelia zeylanica*, *Odina Wodier*, *Ixora parviflora*, *Dolichandrone Rheedei*, *Aristolochia indica*, *Aneilema nudiflorum*, *Cyperus tegetiformis*, *Saccharum spontaneum* are not truly littoral species; they therefore owe their presence here to some agency other than that of ocean currents.

The species of the grassy savannah-swamps are not very numerous and include, among sedges, *Cyperus exaltatus* var. *dives*, *Scirpus grossus*, *Cladium riparium* var. *crassa*; among grasses, Ulu (*Imperata arundinacea*), Kashiya (*Saccharum spontaneum*), Guráná (*Andropogon intermedius*) and especially Nál (*Phragmites Karka* var. *cincta*).

The species of the swamp-forests are by habit sharply subdivided into a smaller group of parasitic or merely epiphytic species that do not come in contact with the mud, and a larger group of rooted species. The parasites include *Cuscuta reflexa*, three species of *Loranthus*, and one *Viscum*. The epiphytes include, *Hoya parasitica*, *Dischidia nummularia*, thirteen species of *Orchidaceæ*, seven epiphytic Ferns, a *Lycopodium* and a *Psilotum*. The purely mangrove forests are usually extensive muddy flats covered at every tide by salt water on which the *Rhizophors* themselves are scattered to make an open forest; the individual trees, owing to their habit of sending down stilted adventitious roots, cover considerable spaces, but leave nevertheless wide intervals between. The mud itself, except for the *Rhizophors*, is often devoid of vegetation, though sometimes patches of two salt-worts, *Arthrocnemum* and *Salicornia*, occur on these muddy slopes. Mud-flats that are covered at high-tide only in the rains, and then necessarily with water that is only brackish, are almost always completely covered by a close crop of *Oryza coarctata*. Steeper muddy banks are more usually covered with seedling Báen (*Avicennia*) and with Hargóza (*Acanthus ilicifolius*) bushes in the central Sundribuns; in the western islands Sátári (*Ægialitis*) is usually associated with and sometimes outnumbers Báen on such banks. The tops of the banks, especially along the larger rivers, are often exclusively occupied by Keora (*Sonneratia apetala*)—most graceful of Sundribun trees and particularly abundant along the convexities of river-reaches. Smaller khals have a more varied riparian vegetation; Ora (*Sonneratia acida*), Báen (*Avicennia*), Dhundol (*Carapa obovata*), Koilsha (*Ægiceras majus*), Dakur (*Cerbera Odollam*), Goria (*Kandelia*), Karanj (*Pongamia*), Bhola (*Hibiscus tiliaceus*), Amanta (*Dalbergia spinosa*)—as frequently erect and shrubby as it is climbing, Gorán (*Ceriops*), Kripa (*Lumnitzera*), Goniári (*Premna integrifolia*), Butráj (*Clerodendron inerme*), Hital (*Phœnix paludosa*), being there especially plentiful. On the side of this riparian fence next to the stream occur frequent patches of Golpátta (*Nipa*) and of the stately grass *Myriostachya Wightiana*. Immediately within this fence is the favourite habitat of Kúmia (*Barringtonia racemosa*), of Gorshingiah (*Dolichandrone Rheedei*) and of Bhaila (*Intsia*). Still narrower channels have frequently only

Koilsha (*Ægiceras*) and associated with it Kedar Sundri (*Brownlowia*) as representatives of the riparian fence. The narrowest creeks of all are often lined, to the exclusion of other species, by a fringe of Golpátta (*Nipa*).

It is on the riparian fence that the climbing species are most plentiful; the commonest is the ubiquitous *Derris uliginosa*, followed in order of frequency by *Finlaysonia*, *Vitis trifolia*, *Dalbergia torta*, *Sarcolobus globosus*, *Parsonsia spiralis*, *Dregea volubilis*. *Derris scandens* at times also occurs here but is more plentiful inside the forests than on their margins; *Finlaysonia obovata* also is not uncommon within the forests, the other creepers rarely occur there.

Just behind the riparian fence occurs any undergrowth to be met with. This consists mainly of Kewa *(Pandanus fascicularis)* with occasional tufts of *Scirpodendron*, clumps of *Crinum*, and bushes of Hargóza *(Acanthus ilicifolius)*. Except, however, in the most northern forests the undergrowth is rarely dense and often there is none. Overhead is the Sundri forest composed mainly of that tree (*Heritiera minor*); of larger size in the central than in the western forests and in the northern islands of either than it is further south. Associated with Sundri on the higher ground is Báen *(Avicennia officinalis)*—the largest of Sundribun trees often reaching 10, sometimes 12-15 feet in girth, and Géngwa (*Excoecaria*), both fairly common; also Shingra (*Cynometra*) which is less plentiful. In the more swampy interior of the islands the companion trees to Sundri are still Géngwa; with it are Kedar Sundri (*Brownlowia*), Amúr (*Amoora cucullata*) and Pussur (*Carapa gangetica*). As we pass southwards the Sundri diminishes in frequency while Géngwa remains, till at length the forests become almost pure Géngwa. By this time, however, the riparian fence characteristic of the Sundri-forest has been replaced by Rhizophors which, as we pass onwards towards the sea, ultimately supplant the Géngwa and give the pure mangrove forest with which we commenced.

Besides the absence of undergrowth, a feature which the Sundri-forest shares with the mangrove- or the Géngwa-forest, the most remarkable feature of the Sundri-forest is the characteristic crop of vertical blind root-suckers, emitted by the roots of various species, notably by those of Sundri itself. The species besides Sundri (*Heritiera minor*) which develop these suckers are Amúr (*Amoora cucullata*), Pussur (*Carapa gangetica*), Ora (*Sonneratia acida*), Keora (*Sonneratia apetala*), Báen (*Avicennia*) and Hital (*Phœnix paludosa*).

In the case of *Phœnix paludosa* the roots, which pass almost vertically downwards, give off numerous branches that pass vertically upwards. The vertical branches are usually small and somewhat inconspicuous, nor do they differ greatly in appearance from the downward growing roots from which they arise. Their structure is, however, peculiar and is apparently adapted to serve a respiratory function.*

The root-suckers of Báen (*Avicennia*), though also small, are sufficiently conspicuous owing to the main roots passing horizontally for great distances from the tree to which they belong and giving off, from their upper side, lines of soft pith-like roots that rise well above the surface of the mud in which the true root is buried. These root-suckers of *Avicennia* are much too soft and flexible to serve either as mechanical supports to the tree or to any great extent as agents in arresting silt and debris. Their chief function appears to be respiratory.

In the case of the remaining species a very decided mechanical effect is produced by these root-suckers. Keora (*Sonneratia apetala*), which is characteristic of river-banks, sends out very wide-spreading roots under the surface of the mud. These roots emit long close lines of root-suckers up to distances of 150 feet or more from the parent stem. The lines of vertical root-shoots act as spurs that deflect the impinging current, lead to accretion of silt, and greatly aid the roots themselves in holding on to the muddy substratum. The shoots that rise from the distal and deeper ends of roots that are nearest to the stream, rise higher and are larger than those on the upper part of the slope and nearer the stem of the tree. In places where the set of a current has become altered, so that the silt thus accumulated is again being removed, it is noticeable that, as the erosion goes on, a deeper layer of roots and root-shoots than the one actually visible at the surface, but belonging to the same tree, becomes bared. These are roots with their suckers that had at some former period become completely buried, when their place was taken by a newer and more superficial system. Roots and suckers thus laid bare after previous complete burial, appear invariably to be dead· The roots of Keora are slender and conical from a rather thick base and are usually quite discrete. Those of Ora (*Sonneratia acida*) are in most respects like those of Keora but are often agglutinated at their bases. In both species they are tough and flexible but not very rigid.

The suckers rising from the roots of Pussur and Amúr, both of which species affect the more low-lying swampy localities in the interior of the islands, are sometimes as much as 3 feet long, the tips of the longest suckers appearing just above the surface of the water at the highest tides. The majority of the suckers hardly reach this level. In both Pussur and Amúr the suckers are cylindric but taper more gently than those of Keora, have blunter points and are more rigid and less flexible.

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* For an account of the structure of these roots a paper by Gage, *On the Anatomy of the Roots of Phœnix paludosa*, in Sc. Mem. Med. Off., Army of India, XII., 103 (1901), should be consulted.

In the case of Sundri the suckers are not so closely set as they are in the two *Sonneratias*; they are also more rigid and less flexible, in this respect resembling the suckers of *Amoora cucullata*. But they differ from all the other root-suckers in being somewhat compressed laterally instead of being cylindric and in arising only at points where the true Sundri roots branch instead of arising in lines along the upper surface. The suckers nearer the stem are moreover wider, *i.e*, have a greater long diameter, than those more remote; the ones nearest the trunk occasionally coalesce with and ultimately form part of the buttresses thrown out at the base of the stem. The root-suckers of Sundri, which prefers to grow on slightly higher ground than Pussur and Amúr, are rarely so long as in these species.* From this fact and from his observations regarding the upper limit of their growth in all the species, Heinig concludes that, besides serving as mechanical supports, these root-suckers in every instance act as respiratory organs. The fact that the roots and suckers of Keora which become completely covered by silt die, and have their places taken by a new and more superficial series of roots and suckers, tends to confirm this conclusion. The conditions under which the species that constitute the Sundri-forests exist are such as to render the suggestion very probable, and the fact that other species, such as Géngwa, are not similarly endowed seems surprising. But in connection with this it is remarkable that though the two *Sonneratias* share the habit, the two *Carapas* do not; moreover, while Sundri (*Heritiera minor*) has root-suckers, another maritime species, *Heritiera littoralis*, not present in the Sundribuns but common on many other Indian coasts, has none.

The extent to which the species characteristic of the Sundribuns accommodate themselves to a greater or lesser degree of brackishness is rather variable. The Rhizophors are plentiful near the coast but some of them, particularly Goria (*Kandelia*), Gorán (*Ceriops*) and Kankra (*Bruguiera gymnorhiza*) are to be found naturally on the banks of the larger rivers even up to the northern boundary of the forests. Their occurrence so far upstream is, however, quite casual, and none of them can be said to extend naturally outside the Sundribuns. Even so near to their natural area as at Calcutta or Chandernagore, the only ones that can be got to thrive and to flower are *Kandelia Rheedei* and *Bruguiera gymnorhiza.* Sundri (*Heritiera minor*)—and what is true of Sundri holds good for Amúr, Pussur, Kedar Sundri and Shingra—is to be found everywhere throughout the forests, but it diminishes considerably in size as we pass westward to where the rivers become more æstuarial and carry outward less fresh water, and diminishes still more both in size and in quantity as we pass southward to where the mangroves predominate. It reaches its highest pitch of development and forms a far purer forest in the northern Bagirhat and in the Khulna forests, where the islands are flooded during the rains by the fresh water of streams distributed immediately from the Ganges. While, however, this is the case, Sundri and its companions do not extend northward into the Bengal plain and even so near its proper habitat as Calcutta, it cannot be induced to thrive so well as the nearly allied *Heritiera littoralis* which is, in *its* proper habitat, more tolerant of salt-water than *H. minor.* Géngwa (*Excoecaria Agallocha*), the only species in the Sundribuns that grows with equal vigour in localities suitable for Sundri or for the mangroves, extends naturally into the Bengal plain, and is as healthy and vigorous at Calcutta as it is in its swamp-forest habitat. Keora (*Sonneratia apetala*), which practically ceases southward where the mangroves begin, extends northward a little way into the Bengal plain but only on the banks of tidal rivers and only where the water is distinctly brackish at high tide. The species survives but does not thrive at Calcutta. Hital (*Phœnix paludosa*) does not appear naturally to extend into the Bengal plain, but in spite of this it attains, as a planted species in the Calcutta Garden, to a height of stem surpassing anything to be met with in the Sundribuns. Golpatta (*Nipa*) can be kept alive at Calcutta, but does not there grow vigorously. Amanta (*Dalbergia spinosa*) also extends along river-banks well into the Bengal plain, but the nearly related Panchioli (*Dalbergia torta*) disappears from the banks of the rivers before the northern boundary of the swamp-forest is reached.

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* For an interesting account of the root-suckers of the Sundribuns consult a paper by Heinig in *Journal, Asiatic Society of Bengal*, Vol. 62, pt. 2, p. 158 (1893). In this paper no reference is made to the presence of root- suckers in Hital (*Phœnix paludosa*).

A few species seem even more indifferent than Géngwa and extend naturally northwards along river-banks as far as the influence of the tides is felt at all. The best instances of truly littoral species that thus accompany the tide-flow are *Hibiscus tiliaceus*, *Thespesia populnea*, *Erythrina indica*, *Canavalia turgida* (*C. lineata*, though so nearly related, does not), *Phaseolus adenanthus*, *Vigna luteola*, *Derris uliginosa*, *Pongamia glabra*, *Morinda bracteata*, *Stictocardia tiliæfolia*, *Acanthus ilicifolius.*

The 334 species so far reported from the Sundribuns belong to 245 genera and to 75 natural orders. Of these 75 orders. no fewer than 32 are represented by only one genus; while as many as 27 of these 32 have only one species. Other 15 natural orders are represented by only 2 genera; other 7 by only 3 genera; yet another 7 by only 4 genera. Only 2 natural orders, *Scrophularineæ* and *Rubiaceæ*, have 5 genera apiece and 3 orders, *Cucurbitaceæ*, *Verbenaceæ* and *Palmeæ*, have 6 genera. Of natural orders with more than 6 genera, *Orchidaceæ* have 8, *Cyperaceæ* and *Polypodiaceæ* each 9, *Asclepiadaceæ* and *Compositæ* each 11, *Euphorbiaceæ* 14, *Gramineæ* 18, *Leguminosæ* 25. As regards number of species, *Leguminosæ* with 38 species leads; followed by *Gramineæ* with 29; *Cyperaceæ* with 19; *Euphorbiaceæ* with 16; *Polypodiaceæ* with 14; *Orchidaceæ* with 13; *Asclepiadaceæ* with 12; *Convolvulaceæ* with 9; *Cucurbitaceæ* with 7; *Malvaceæ*, *Rhizophoreæ*, *Rubiaceæ*, *Urticaceæ* and *Palmeæ* each with 6; the rest with 5, or fewer than 5.

Of the 245 genera, no fewer than 190 are represented by only one species; of the remaining 55, as many as 35 have only 2 species; other 11 have only 3 species; other 6 only 4 species each; one has 5 species; only two genera, *Ipomœa* and *Panicum* have each 6 species. The subjoined table gives a brief *resumé* of the composition of the Sundribun flora from the taxonomic point of view :—

TABLE I.—*Systematic Synopsis of Sundribun Plants.*

	Orders.	Genera.	Species.
Thalamifloræ	10	18	20
Disciflorae	9	17	21
Calycifloræ	10	46	64
Corollifloræ	19	63	86
Incompletæ	9	30	39
Monocotyledons	15	59	87
Vascular Cryptogams	3	12	17
TOTALS	75	245	334

IV.—ORIGIN OF THE SUNDRIBUN FLORA.

The geographical position and the physical condition of the Sundribuns show that they are only part of the alluvial plain of Lower Bengal, the whole of which is of recent geological formation, and that, as a matter of fact, the process of extension of that plain is here going on under our eyes. Moreover, when borings are made or deep tanks or canals are dug in the Lower Gangetic Plain at a considerable distance to the north of the existing Sundribun forests, a layer of soil is found at no very great depth in which are present the remains of species that now exist in the Sundribuns, but that have retreated from the actual neighbourhood of the excavation. On the other hand, we find places well to the south of the northern limits of the existing Sundri-forest where, on steep banks that are subject to erosion, a layer of broken bricks and pottery is being exposed at a level well below that of the high tides of the rainy season. Whether these facts, taken in conjunction, indicate that the Sundribun area has been subjected to alternations of elevation and subsidence is an open question. Whatever may be the truth in this respect there is no doubt that all of the surface soil in the lower Gangetic delta is newly-formed land. This being the case, there can be no such thing in the Sundribun forests, savannahs or clearings as an indigenous species. The nature of the flora, with its extraordinary proportion of genera and even of natural families that, so far as this region is concerned, are monotypic, points to the same conclusion. An examination of the Sundribun flora therefore resolves itself into a discussion of the dispersal and the distribution of its species; a study of how and whence the plants now present in the area have been introduced. The simplest method of dealing with the problems involved is to deal first with the dispersal of these species and to commence with those plants that inhabit the swamp-forests and constitute the more characteristic part of the flora. The different possible agencies of dispersal may be accepted as (1) *Human*, by which the introduction may have been (*a*) *intentional*, as in the case of cultivated or planted species, and (*b*) *inadvertent*, as in the case of weeds of fields or waste-places (2) *Bird*, and then either (*a*) by *water-birds* that carry seeds of small size or, rarely, spores attached to their feet, or to the feathers near the base of their bills, along with pellets of mud; or (*b*) by *fruit-eating* birds that void uninjured the seeds of fleshy fruits or seeds provided with a mace: (3) *Wind*, carrying seeds or spores that are sufficiently small and light, or seeds or fruits provided with wing-like expansions, or with a coma or pappus, that may act as a parachute: (4) *River*, bringing down from the Indian Hills or from the Gangetic plain seeds and fruits of various kinds: (5) *Sea*, bringing, by means of currents and tides, the seeds and fruits of, usually, littoral species from other shores.

Swamp-Forests.—Species introduced by man whether by accident or by design, are not to be expected in the swamp-forests: the only unequivocal instance is *Odina Wodier*, a species planted in existing clearings and plentiful where there are vestiges of former occupation; this was also obtained by the writer at a small camping-ground used by wood-cutters on the bank of the Ambaria khal. Nor are species likely to be introduced by water-birds to be expected in these forests: none have so far been found. Species in all probability introduced by fruit-eating birds are not plentiful; the three species of *Vitis*, with the three species of *Loranthus*, a species of *Viscum*, a *Cuscuta*, a *Ficus* (*F. retusa* var. *nitida*) and the *Leea*, are perhaps the least equivocal instances. Except the *Leea*, which may equally well have been introduced by water, it is to be noted that all these species are either climbers or parasites. The *Ficus*, it is true, does not persistently climb, but it begins life as an epiphytic climber. Species introduced by wind agency are nearly thrice as numerous. They include thirteen epiphytic orchids, *viz.*:—an *Oberonia*, two *Dendrobia*, a *Cirrhopetalum*, a *Trias*, two *Luisiæ*, three *Saccolabia*, two *Sarcanthi*, and a *Cleisostoma*, all with minute and very light seeds; eight epiphytic vascular Cryptogams, *viz.*:—*Asplenium falcatum*, *Polypodium quercifolium*, *adnascens* and *irioides*, a *Vittaria*, a *Drymoglossum*, *Acrostichum scandens*, a *Lycopodium* and a *Psilotum*, all reproduced by means of minute spores. The obscure *Pteris* (*P. vittata*), if one may judge from its figure and description, should belong to this category. The other wind-introduced species are mostly climbers, their seeds being provided with a pencil of hairs that serves as a parachute; they include *Parsonsia spiralis* (Apocyneæ), *Dregea volubilis* and *Finlaysonia obovata* (Asclepiadaceæ) which are rooted in the ground, with two epiphytic Asclepiads, *Hoya parasitica* and *Dischidia nummularia*. The only swamp-forest tree for which introduction by wind seems unequivocal is *Dolichandrone Rheedei*, which has seeds with large membranous marginal wings. One non-epiphytic fern, *Acrostichum aureum*, is possibly also a wind-introduced species.

Species that almost certainly owe their presence in the Sundribun forests to their seeds having been washed down from Upper India or from the Himalayan slopes by the great rivers are less numerous than those introduced by wind-agency. As might be expected they vary considerably in habit and include among herbaceous forms *Alpinia Allughas*, *Typha elephantina*, and *T. angustata*, *Cryptocoryne ciliata* and *Oryza sativa*; among climbers, *Teramnus flexilis*, *Derris scandens*, *Caesalpinia Nuga* *, *Mezoneuron cucullatum*, *Entada Pursætha*, *Acacia concinna* and *A. Intsia*, *Mallotus repanda*, *Ipomœa paniculata*, *Calamus tenuis* and *Dæmonorops Jenkinsianus*; among erect species, *Tamarix gallica*, *Micromelum pubescens*, *Flemingia congesta*, *Acacia tomentosa* and *Cyclostemon assamicus*. The two most striking features among the species of this list, as will be seen on consulting the systematic census of Sundribun plants, are the extent to which these species are confined to the northern forests only, and the number of them that have been only once reported—often only in the old collections from 1796 to 1856. The latter fact suggests naturally the question whether some of them deserve to be considered truly Sundribun species and whether, though now and again one of them has been met with, all or any of them are capable of persisting in the Sundribuns. The only one that is plentiful throughout the forests is *Derris scandens*; the only one for which the agency is doubtful is the *Cryptocoryne*: not one of them, it will be observed, is a tree of any size.

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* This species is also capable of introduction by the sea, and is plentiful on the coasts of the Andamans: in our northern forests it is, however, possibly a riverine immigrant; at the sea-face, where it also occurs, it is quite probably a sea-introduced species.

The rest of the swamp-forest species, 58 in number, are probably all sea-introduced species. For the majority this agency is unequivocal; the case of *Paramignya longispina* appears doubtful, yet it is difficult to imagine any other agency as responsible for its presence. Another equivocal case is that of *Kleinhovia hospita*. This is one of Ellis' discoveries and, next to his rediscovery of *Oryza coarctata*, is the most interesting. Ellis only collected it once and has given no exact locality for his specimens, so that it might be suggested that this is not a swamp-forest species but one of the trees characteristic of the sites of abandoned settlements or even a tree planted in some recent clearing. The vernacular name connoting it is given as Bhoḷa, a name usually applied to *Hibiscus tiliaceus* which, in the shape and venation of its leaves, *Kleinhovia* somewhat resembles. The fact that the vernacular name used should be that properly belonging to one of the most plentiful and familiar of Sundribun species, hardly suggests that *Kleinhovia* is an introduced species; had it been so, some qualifying epithet would almost certainly have been employed by a native wood-cutter or forest official. The indication rather is that the tree is a Sundribun species, but that it is so rare as not to have a name of its own. This use of the vernacular name, coupled with the fact that none of Ellis' other specimens are from existing settlements, practically disposes of the suggestion that his *Kleinhovia* was a planted tree. It was carefully looked for in all the settlements visited by the writer, but was nowhere seen; it has never been sent from any settlement by Heinig; the tree is, moreover, of little economic importance and is not at all a likely species for settlers to introduce. The date of the introduction of the species to Bengal by Roxburgh, who received it from the Moluccas, was 1796, by which time the old settlements of pirates and salt-smugglers in the Sundribuns had either been abandoned or their inhabitants had ceased to hold such intercourse with Calcutta as the introduction of new and rare trees would involve. The suggestion that Ellis' specimens are from some place like Mandabari or Jatta may therefore be ignored. The fruits of

Kleinhovia are well adapted to dispersal by ocean currents; its distribution is very similar to that of *Scirpodendron*, *Cladium*, *Brownlowia*, *Phœnix paludosa*, *Myriostachya* and other characteristic and well known Sundribun species. The fact that the species was introduced to the Calcutta Garden from the Moluccas by Roxburgh in 1796 is no more an argument against its being wild in the Sundribuns than are the facts that *Intsia* was introduced to the same garden from Singapore in 1835, and *Dolichandrone* was introduced from Southern India in 1830, arguments against these two, which are both wide-spread trees in the Sundribun swamp-forests, being truly wild in our area.

The species introduced by the sea are variable in habit; a few are herbaceous, like *Myriostachya*, *Scirpodendron*, *Oryza coarctata*, *Mariscus albescens*, *Crinum asiaticum*, *Salicornia brachiata*, *Arthrocnemum indicum*; a few are climbers, like *Flagellaria indica*, *Acanthus volubilis*, *Ipomœa illustris*, *Merremia hederacea*, *Sarcolobus globosus* and *S. carinatus*, *Dalb rgia torta* and *D. spinosa*, *Derris uliginosa*, *Canavalia turgida*, *Mucuna gigantea*; or rambling shrubs, like *Hibiscus tiliaceus* and *H. tortuosus*, *Paramignya longispina* and *Salacia prinoides*: the rest are erect shrubs, like *Acanthus ilicifolius*, *Clerodendron inerme*, or trees of smaller or larger size. The most notable feature of the Sundribun swamp-forest flora is that half the species are probably sea-introduced, the balance owing their presence chiefly (1) to wind-agency and (2) to introduction by large rivers; a few have come (3) owing to the agency of frugivorous, but none owing to that of wading birds; only one owes its presence to (4) man.

Grass-Savannahs.—The species that forms the basis of these grassy swamps is *Phragmites Karka* var. *cincta*; this doubtless owes its presence here to wind-agency, which in all probability is also accountable for the presence of *Imperata*, of *Saccharum spontaneum* and perhaps, though in the last instance introduction by rivers is also conceivable, of *Andropogon intermedius* as well. The sedges present cannot well be wind-introduced species, but whether they are to be looked on as introductions by water-birds, by rivers, or by the sea is an open question, since all three agencies of dispersal are conceivable. Having regard to their distribution, however, one may conclude that the *Cladium* is probably a sea-introduced species, while *Scirpus grossus* and *Cyperus exaltatus* may be considered introductions either by means of water-birds or by rivers. The two bulrushes, also found on the margins of such grassy swamps, may similarly be introductions either by water-birds or by rivers; *Acrostichum aureum*, which is also present in such places, may have been dispersed by birds or by wind. None of the savannah species are likely to have been introduced by fruit-eating birds or by man and, on the whole, the inanimate agencies of dispersal,—winds, river-currents or tides—are the probable agencies for all.

Sea-Face.—The species that constitute the fence of shrubs and creepers immediately behind the line of low sand-hills that occur along the coast wherever the actual shore is subject to the influence of the waves, and the species that are to be met with on these sand-hills themselves, exist under conditions as to light and soil very different from those that prevail in the swamp-forests and, as regards soil at least, quite unlike those offered by muddy banks that shelve under the sea whereon the salt-worts grow, or that exist in the swamp-savannahs. This being the case, it is not surprising to find, as we did in the preceding chapter, that 40 per cent. of the Sundribun sea-face plants are confined to this sea-fence or to these sand-hills.

None of these sea-face plants have been introduced by man, and none are likely to have been introduced by water-birds. Frugivorous birds may, however, be responsible for the introduction of *Capparis sepiaria*, though this is just as likely to have been brought by the sea; of *Allophylus Cobbe*; of *Vitis trifolia*; of *Ixora parviflora*, though this has more probably been washed down from Upper India by one of the rivers; of both species of *Vitex*, though both are common sea-coast species in the Andamans and Burma, and may be here sea-introduced, while, for that matter, *V. Negundo* at least may have been brought down by the rivers; of *Cassytha filiformis*, though this, which is a frequent parasite on *Ipomœa pes-capræ* on Andaman sea-beaches, may have come here by the sea; of *Ficus Rumphii*, though this too may be sea-introduced as it is a very common, indeed almost unfailing denizen of the corresponding sea-fence on the shores of the Andamans. Bird-agency, then, seems unequivocal only in the case of two species. Wind-agency is perhaps unequivocal in the case of *Naravelia zeylanica*, *Dolichandrone Rheedei*, and *Saccharum spontaneum*; it may explain the presence of *Aristolochia indica* though this has more probably been washed down by the rivers, and of *Launea pinnatifida*, though this is more likely to have been brought by the tides.

Species at the sea-face almost certainly washed down by rivers are *Cassia Sophera*, *Tamarix*, *Crotalaria retusa*, *C. Saltiana* and *C. verrucosa*, *Aneilema*, *Lippia geminata*, *Cyperus tegetiformis*; those probably introduced here by this agency are *Odina Wodier*, *Derris scandens*, *Ixora parviflora*, *Aristolochia indica*, *Trewia nudiflora*.

Another species which may have been thus introduced, but which is more probably an instance of introduction by the sea, is *Cæsalpinia Bonducella*, a shrub plentiful behind Andaman sea-beaches. The remainder of the sea-face species are probably unequivocal instances of sea-introduction, so that two-thirds of the sea-face flora as against only one half of the swamp-forest flora is of truly littoral type. A few of the species, like *Derris scandens*, *Dolichandrone Rheedei*, *Barringtonia racemosa*, *Acanthus ilicifolius*, *Crinum asiaticum* are to be found within the swampy islands, but the majority of the sea-face plants that are also to be found in the swamp-forests are there strictly limited to the banks of the large rivers. Such species are *Vitis trifolia*, *Desmodium umbellatum*, *Vigna luteola*, *Dalbergia torta*, *Cæsalpinia Nuga*, *Ipomœa illustris*, *Clerodendron inerme*, *Sesuvium Portulacastrum*, *Mariscus albescens*, *Oryza coarctata*. A number of the sea-face plants, however, that find the conditions offered by the swamp-forests uncongenial, recur on the sites of abandoned settlements, along the northern fringe of the forests, or in the existing clearings; examples that may be cited are *Naravelia zeylanica*, *Capparis sepiaria*, *Thespesia populnea*, *Crotalaria verrucosa* and *C. Saltiana*, *Erythrina indica*, *Trewia nudiflora*, *Ficus Rumphii*, *Pycreus polystachyus*, *Fimbristylis ferruginea*, *Zoysia pungens*; the last named is also met with at the upper margins of newly-formed mud-banks not yet afforested by swamp-forest species. One sea-face species, *Saccharum spontaneum*, also occurs in the grassy savannahs.

Abandoned Sites.—In places where there are vestiges of former occupation by salt-smugglers or dacoits or where, as at Jatta, a settled population had at some former time obviously existed, a number of characteristic species are to be found; these have been fully dealt with in a former chapter and, as might be expected from the topography and the physical conditions of such localities, they do not include any species likely to have been introduced by the sea. Nor can rivers be held directly responsible for the introduction of any of the species. Two for which this means of dispersal is conceivable are *Crotalaria verrucosa* and *Derris scandens*, but of these the first is more likely, in places of the kind, to have been inadvertently introduced by man as a field-weed; the *Derris*, though doubtless brought down from Upper India or Assam by rivers in the first instance, has more probably been carried to such spots by wind from the neighbouring swamp-forests. As regards wind-agency too the number of introductions is very small, for even if we consider *Derris scandens* as here *locally* wind-introduced, we have only five species for which this means of dispersal is at all likely, the other four being *Vernonia cinerea*, which is just as likely to be an inadvertently introduced weed; *Dioscorea pentaphylla*, which may also be a weed; *Hemidesmus indicus* and, finally, *Adiantum lunulatum* for which this agency is doubtless unequivocal. The inanimate agencies, for these particular sites, count for little as compared with the animate ones.

Water-birds are probably responsible for the introduction of *Limnophila gratissima*, *Hygrophila phlomoides*, *Pistia stratiotes* and perhaps for that of *Paspalum scrobiculatum* and *Panicum colonum*. Fruit-eating birds, however, have been a more active agency and are probably responsible for the presence of *Vitis trifolia* and *V. latifolia*, of *Breynia rhamnoides* and *Bridelia stipularis*, of *Aphania Danura*, *Olax scandens*, *Glycosmis pentaphylla* and *Tinospora tomentosa*, of *Trema orientalis*, of *Ficus Rumphii*, and of the four Cucurbitaceous plants found on these abandoned sites. Other species, possibly thus introduced, though the agency is not unequivocal since all of them may conceivably have been deliberately introduced by man, are *Clerodendron Siphonanthus*, *Streblus asper*, *Eugenia fruticosa*, *Ficus religiosa* and *F. infectoria*, *Antidesma Ghaesembilla*; perhaps *Flacourtia sepiaria* might be classed with these.

Human agency may be held less equivocally responsible for the deliberate introduction of *Cratæva religiosa*, *Ægle Marmelos*, *Zizyphus Œnoplia*, *Bouea burmanica*, *Odina Wodier*, *Cassia Fistula*, *Vangueria spinosa*, *Ixora coccinea* var. *Bandhuca*, *Diospyros Embryopteris*, *D. montana*, *Cordia Myxa*, *Ocimum sanctum*, *Zingiber Casumunar*; is not improbably responsible for the presence of *Abrus precatorius*, though this may have been inadvertently introduced; of *Croton oblongifolius*, the existence of which is not otherwise easily explained; and of *Streblus asper*, *Flacourtia sepiaria* and *Antidesma Ghæsembilla*: *Clerodendron Siphonanthus*, too, is a species that may conceivably have in the first instance been planted.

Species that are mere weeds of cultivation elsewhere, and that in these clearings almost certainly owe their presence to inadvertent introduction by man with his crops are *Cleome viscosa*, *Atylosia scarabæoides*, *Crotalaria verrucosa*, *Anisomeles ovata*, *Acalypha indica*, *Commelina bengalensis*, *Kyllinga triceps*, *Fimbristylis monostachya*, *Panicum prostratum* and *Setaria glauca*,—not a very extensive list, the chief interest of which lies in the fact that eight of these species have not been found as weeds in any of the existing clearings. Another possible member of the group is *Vernonia cinerea*, a common weed in existing clearings that may quite readily be a wind-borne species; still another is *Abrus precatorius*, which, however, having regard to its reputed qualities, is quite likely to have been deliberately introduced. Very nearly half the species in these old settlements must be looked on as having been introduced by man.

Existing Settlements.—In the extensive clearings that occupy much of the eastern Sundribuns, and in the line of constantly encroaching settlements along the northern border of the swamp-forests, the proportion of species introduced by man, whether purposely or by accident, is naturally very much higher than on abandoned sites. Another class of species well represented in such localities is that of plants introduced in all probability by water-birds: this is to be explained by the existence of many still-water ditches behind the embankments that have been thrown up to keep out the high tides, and by the presence of small ponds dug to provide drinking-water for the population. The number of species introduced by fruit-eating birds, on the other hand, is much smaller; this doubtless is to be explained by the absence of trees on which to rest, and the presence of inhabitants, rendering these clearings less inviting as resting places for birds of this kind than are the forests in their vicinity. Of the inanimate agencies, wind has been here the least effective; rivers, as might be expected, have been responsible for the introduction of not a few species that find the conditions in these clearings practically identical with those in the Bengal rice plain whence they have been brought, and that therefore survive here when in the swamp-forests or at the sea-face they can find no foothold. Contrary to expectation, however, it is found that the agency of the sea is responsible for a very marked proportion of the species present in these clearings. This is to a considerable extent due to the survival of swamp-forest species along the banks of khals and on the sides of bunds, and to some extent owing to the fact that these clearings offer conditions suitable for plants growing at the sea-face that are incapable of subsisting in the swamp-forests. The littoral element in the vegetation of these clearings is not, however, to be explained entirely in this way; there are a number of species, very characteristic of sea-shores elsewhere in South-Eastern Asia, which one does not find in the Bengal plain outside the limits of these Sundribun clearings, but which one looks for equally in vain in the swamp-forests or at the sea-face.

Maritime species of this class are *Phaseolus adenanthus*, very plentiful on Andaman beaches; *Stictocardia tiliæfolia, Agvneia bacciformis, Blumea amplectens* var. *maritima, Sphæranthus africanus, Wedelia scandens, Pluchea indica* and *Suaeda maritima*—both occasionally met with in naturally clear spaces in the forests, *Azima, Psilotrichum, Solanum trilobatum, Cyperus scariosus, Fimbristylis polytrichoides* var. *halophila, Paspalum distichum, Scirpus triqueter* var. *segregata*. Other sea-borne species in open clearings are *Pycreus polystachyus* and *Zoysia*. Species introduced by the sea that survive along bunds and banks of khals in the clearings are *Canavalia turgida, Vigna luteola, Derris uliginosa, Pongamia, Dalbergia spinosa, Cæsalpinia Nuga, Sonneratia apetala, Morinda, Ægialitis* and *Ægiceras,* the two *Sarcolobi, Acanthus ilicifolius, Clerodendron inerme, Premna integrifolia, Avicennia officinalis, Excoecaria, Flagellaria, Pandanus fascicularis.*

Species in clearings that have been introduced by rivers include *Tamarix gallica, Cæsalpinia Bonducella* probably, *Barringtonia acutangula, Conyza semipinnatifida, Wedelia calendulacea*—though this might equally well be an introduction by water-birds, *Ipomæa sepiaria, Lantana indica* and *L. trifolia, Lippia geminata* and *L. nudiflora, Trewia nudiflora, Casuarina equisetifolia,** two species of *Typha, Cryptocoryne, Cyperus exaltatus, Scirpus littoralis, Panicum repens.* Wind-introduced species in the clearings include *Vernonia cinerea* and *Ageratum conyzoides,* though both these might have been introduced as weeds with crops; *Grangea maderaspatana* and *Cnicus arvensis,* to which the same remark will apply; *Oxystelma esculentum, Dæmia extensa, Tylophora tenuis, Pentatropis microphylla, Imperata arundinacea, Chloris barbata, Asplenium esculentum, Nephrodium aridum, Polypodium proliferum, Acrostichum aureum, Helminthostachys zeylanica.*

Fruit-eating birds are possibly responsible for the introduction of *Passiflora suberosa, Cephalandra* and *Cucumis,* and almost certainly responsible for the presence of *Vitis trifolia*; they are also in all likelihood responsible for the dispersal in a wild state of *Basella,* but the influence of this agency is necessarily slight and cannot be associated with any other species. Water-birds, on the other hand, have to be credited with the introduction of all the fresh-water submerged or floating species enumerated in the previous chapter except *Ipomæa aquatica,* which is almost certainly a plant originally deliberately introduced. Besides these this agency probably explains the presence of *Hydrolea, Ammannia, Herpestis,* three *Hygrophilæ, Hemigraphis, Eleocharis,* one *Scirpus, Paspalum scrobiculatum, Eriochloa polystachya, Panicum Crus-galli* and, perhaps, *Diplachne fusca.*

Species intentionally introduced by man and still either under cultivation or existing as escapes have been already given in detail. The number of these species is not very great and the list is probably incomplete. The rest of the plants to be met with in clearings are weeds in all probability inadvertently introduced by man. The number of these weeds is by no means great, when the extent of the cleared area is considered, and hardly exceeds that of species whose presence is almost certainly due to the tides and ocean-currents. The subjoined table gives a synopsis of the facts detailed in the foregoing paragraphs.

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* See remarks regarding this species in the systematic census.

Table II.—Mode of introduction of Sundribun Plants.

Species introduced by —— into	Animate Agencies.				Inanimate Agencies.		
	Man.		*Birds.*		*Winds.*	*Rivers.*	*Tides.*
	Intentionally.	Inadvertently.	Aquatic.	Frugivorous.			
Existing clearings . . .	23	56	29	4	15	19	36
Abandoned settlements . .	16	10	5	20	5	...	...
Grassy savannahs . . .	...	...	...	...	4	5	1
Swamp-Forests . . .	1	...	...	10	32	21	58
Sea-face fence . .	...	...	...	2	3	11	31
Total, eliminating overlapping of species in different areas .	36	58	30	23	50	41	96

The concluding portion of this enquiry into the origin of the Sundribun Flora involves a brief review of the distribution of the species in order to determine whence these have come into the region.

When those species that have possibly been originally introduced intentionally are considered, we find altogether 36 distributed as follows:—

Both westward and eastward from the Sundribuns . .		31
Cosmopolitan in the Tropics	5	
Tropics of Eastern Hemisphere, Australia, Polynesia	2	
Tropics of Eastern Hemisphere, Australia . .	4	
Tropics of Eastern Hemisphere	1	
South-Eastern Asia, America (*Parkinsonia*) .	1	
South-Eastern Asia, Australia	3	
South-Eastern Asia (India, Indo-China, Malaya) .	11	
India, Indo-China	4	
Eastward only to Indo-China and Malaya (*Bouea*) . .		1

Westward only		4
India, Africa (*Acacia arabica*)	1	—
India only (*Cyamopsis, Ægle, Ficus religiosa*)	3	
	—	

With the solitary exception of *Bouea*, which is very rarely cultivated in Eastern Bengal, all of the species in the list are familiar plants in the Bengal Plain immediately to the north of the Sundribuns. This fact, taken in conjunction with the circumstance that for at least 10 per cent. of the species the introduction can only have been from the north, points to the conclusion that all the planted species, except perhaps *Bouea*, have been introduced from Bengal.

This conclusion is somewhat strengthened when the distribution of the introduced weeds is considered, for it may be safely assumed that inadvertently introduced species must in most cases have accompanied the deliberately introduced ones. The 58 weeds present we find to be distributed as follows:—

Both westward and eastward		51
Cosmopolitan in the Tropics	24	—
Tropics except Australia	2	
Tropics except Australia and Polynesia	3	
Tropics except Polynesia	1	
Tropics of Eastern Hemisphere, Australia, Polynesia	1	
Tropics of Eastern Hemisphere, Australia	2	
Tropics of Eastern Hemisphere, Polynesia	1	
Tropics of Eastern Hemisphere	10	
South-Eastern Asia, America	1	
South-Eastern Asia, Australia, Polynesia	3	
South-Eastern Asia, Australia	1	
India, Indo-China	1	
India, Chittagong	1	
	—	
Westward only		7
America only	3	—
America, Africa	1	
Africa, India	1	
Europe, India	1	
Europe only	1	
	—	

The weeds, as might be expected, are much more cosmopolitan than the cultivated species (about 50 per cent. in place of 12 per cent.) and the localised, purely South Eastern Asiatic weeds are fewer than the localised, purely South Eastern Asiatic planted species (about 4 per cent. in place of about 40 per cent.). In the case of the weeds there are no species distributed to the east but not to the west, while as many as 12 per cent. are distributed to the westward of the Sundribuns only. Every thing therefore indicates that the species introduced by human agency have come from the north and west.

The species possibly introduced by water-birds are 30 in number, distributed as follows :—

Both westward and eastward		27
Cosmopolitan in the Tropics	10	
Tropics of Eastern Hemisphere and Australia	4	
Tropics of Eastern Hemisphere	1	
South-Eastern Asia, Australia, America	1	
South-Eastern Asia, Australia	3	
South-Eastern Asia, Europe	1	
South-Eastern Asia	3	
Australia, Europe	1	
India, Indo-China	3	
Westward only		3
India, Africa	1	
India	2	

The high percentage of cosmopolitan species brings plants of this group almost on a parallel with the introduced weeds. Here again none of the species are distributed to the eastward only; the species distributed to the westward only constitute 10 per cent. of the whole; it may therefore be concluded that these bird-introduced species, like the species introduced by man, are immigrants from the north.

When the 23 species, for which dispersal by fruit-eating birds is almost certain, are considered, we find a great contrast in their distribution since none of them are cosmopolitan, and more than half of them are confined to South-Eastern Asia (India, Indo-China, Malaya). The details are :—

Distributed both westward and eastward		21
To Africa and throughout South-Eastern Asia	3	
Throughout South-Eastern Asia and to Australia	5	
Throughout South-Eastern Asia and to New Caledonia	1	
Throughout South-Eastern Asia	8	
Throughout India and Indo-China	4	
Distributed westward only (*Loranthus longiflorus*)		1
Distributed eastward only; to Eastern Bengal north of the Sundribuns, and to Assam (*Loranthus Scurrula* var.)		1

If one may judge by the predominance of species that pass beyond South-Eastern Asia to Northern Australia and New Caledonia, over those that extend beyond South-Eastern Asia to Africa, we can suppose that the pendulum-like bird-migrations which alternate with the monsoons throughout the submeridional ranges of hills and islands of Eastern Asia, are chiefly responsible for the introduction of such species into the Sundribuns. The figures, though too meagre to be conclusive, are not contrary to this deduction, which is in keeping with observed facts as regards the Andamans.

Passing now to the various inanimate agencies of dispersal, we have first to deal with species that are introduced by wind. Space forbids an examination in minute detail of the features of distribution of each of these plants, the requisite data for which are, however, given in the systematic census. It is sufficient here to say that they may be divided into four natural groups: (*a*) those with light spores (Vascular Cryptogams), of which the epiphytic forms either are cosmopolitan or are at least widely disseminated in the Old World and the terrestrial are at least widespread in South-Eastern Asia; (*b*) those with seeds or fruits of some size provided with a feathery pappus, a coma, or some equivalent arrangement,—again either cosmopolitan or, at least, widespread in South-Eastern Asia; (*c*) those with seeds provided with wings, of which we have but two examples, a *Dolichandrone* widely spread in South-Eastern Asia, and a *Dioscorea* that is found everywhere in the tropics of the Eastern Hemisphere; lastly, (*d*) those with very small and light seeds (Orchids) apparently exceedingly well adapted for dispersal by winds but nevertheless with often a remarkably localised distribution. The general features of the distribution of the 50 species of the class are :—

Distributed both westward and eastward		35
Cosmopolitan in the Tropics	6	—
Tropics of Eastern Hemisphere, Australia, Polynesia	1	
Tropics of Eastern Hemisphere, Australia	3	
Tropics of Eastern Hemisphere, Polynesia	3	
Tropics of Eastern Hemisphere	3	
South-Eastern Asia, Northern Australia, Polynesia	1	
South-Eastern Asia, Northern Australia	2	
South-Eastern Asia, Melanesia	1	
South-Eastern Asia	11	
India, Eastern Himalaya, Indo-China	3	
India (Circars), Tenasserim	1	
	—	
Distributed eastward only		10
Indo-China, Malaya, Northern Australia	1	—
Indo-China, Malaya	1	
Eastern Himalaya (Sikkim) and Indo-China	6	
Indo-China	2	
	—	

Distributed westward only (India and Ceylon) . . .	2
Undistributed (*Oberonia Gammiei, Cirrhopetalum Roxburghii, Pteris vittata*)	3

The number of Indo-Chinese species that the Sundribuns share with Sikkim, which cannot, however, be regarded as a western region, is rather striking. It is not a little remarkable that three of the species not hitherto collected anywhere except in the Sundribuns should be species of a class eminently adapted for dispersal by means of an agency so constantly active in the area as wind.

The distribution of the 41 probably river-borne species does not call for detailed analysis, and the only remarks that have to be made regarding them turn on the question as to whether their presence in the Sundribuns is due to their having been brought down by the Ganges or the Brahmaputra. The topography of the region indicates that in most cases the Ganges is more likely to have been the agent, though with a number of the species either river may have been responsible, while there are a few species, such as *Micromelum pubescens, Teramnus flexilis, Eugenia fruticosa, Conyza semipinnatifida, Lippia geminata, Pandanus fœtidus, Dæmonorops Jenkinsianus, Cyperus inundatus*, that, having regard to their known distribution and in some cases also to their actual locality in the Sundribuns, we must believe to have been brought down by the Brahmaputra and not by the Ganges, if this means of dispersal be really responsible for their presence in our area. One species, moreover, for which the writer assumes tentatively this means of dispersal offers some difficulty. This is *Cryptocoryne ciliata*, a species very plentiful in Lower Bengal and one that is carried about in this particular manner, by upward-flowing tides: it is, however, fair to remark as well as by falling ones. The difficulty lies in the fact that this *Cryptocoryne* is confined to Lower Bengal, so far as India is concerned, and as it is also a Malayan species, the question arises whether it may not really be, as Mr. Clarke considers, a characteristic Sundribun plant, the presence of which in India is due to introduction by the sea. The objection to this conclusion is, after all, only that it does not appear to enter the Sundribun forests, or to establish itself in our area till clearings have been effected—a not insuperable objection when the case of species like *Blumea amplectens* var. *maritima, Paspalum distichum, Fimbristylis polytrichoides* var. *halophila, Solanum trilobatum, Azima tetracantha, Psilotrichum ferrugineum, Agyneia bacciformis* and *Sphæranthus africanus* are considered. The great difference between the *Cryptocoryne* and these other species lies in its submerged habit; it is easy to understand why the other species mentioned should find the conditions of the swamp-forests inimical to their welfare;

there is no obvious reason why *Cryptocoryne* should decline to establish itself on the banks of muddy creeks before the forest disappears and yet do so profusely wherever a clearing has been effected.

The most interesting part of the enquiry into the distribution of the Sundribun species is that which concerns the sea-borne plants to be met with in the swamp-forests, at the sea-face and, to a less but still an appreciable extent, in the northern clearings. The subject has already been very fully and instructively dealt with by Mr. C. B Clarke* so that here only the briefest summary is necessary. It is sufficient to say that the results of an examination in detail of their distribution indicate that to a greater extent than even with the wind-borne element in the Flora, these species are of Malayan and not of Indian type. The distribution of the 96 species of this kind is summarised as follows :—

Distributed both westward and eastward		63
Cosmopolitan on tropical coasts	12	
Coasts from America to Malaya	1	
Coasts from Eastern Africa to Polynesia	4	
Coasts from Eastern Africa to Northern Australia	1	
Coasts from Eastern Africa to Malaya	6	
Coasts from Eastern Africa to Malaya but not on those of India or Indo-China	1	
Coasts from Mascarenes to Polynesia	3	
Coasts from Mascarenes to Polynesia but not on those of India or Geylon	1	
Coasts of Mascarenes, Coromandel and Java	1	
Coasts from Malabar to Polynesia	6	
Coasts from Malabar to Polynesia but not in Coromandel	2	
Coasts from Malabar to Australia	2	
Coasts from Malabar to Australia but not in Coromandel	1	
Coasts from Malabar to Malaya	11	
Coasts from Malabar to Malaya but not in Coromandel	5	
Coasts from Malabar to Indo-China	1	
Coasts from Malabar to Indo-China but not in Coromandel	1	
Coasts of Ceylon, Indo-China, Malaya, Australia	1	
Coasts of Ceylon, Malaya, Australia, Polynesia	1	
Coasts of Coromandel and Indo-China	1	
Coasts of Coromandel and China-Japan	1	
Distributed only eastward		23
Coasts eastward to Polynesia	2	
Coasts eastward to Australia and New Guinea	3	

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* Proceedings, Linnean Society of London, 1894-95, pages 14—29

Coasts eastward to Southern China and Malaya	8	
Coasts of Malaya only	4	
Coasts to Tenasserim only	6	
Distributed only westward		7
Coromandel to Eastern Africa	1	
Coromandel to Eastern Africa but not in Malabar	1	
Coromandel, Ceylon	1	
Coromandel only	1	
Ceylon only	2	
Scinde only	1	
Not reported from elsewhere than the Sundribuns (*Hibiscus tortuosus, Carapa gangetica, Psilotrichum ferrugineum.*)		3

The Flora to which nearly all except the seven species that are distributed only westward belong, is the Malayan 'Strand-Flora,' composed of littoral species that characterise every shore from Melanesia to the Mascarene Islands. Its natural area includes the shores of the various archipelagos from Vavau to Fiji, from New Caledonia to the Carolines; the shores of the Philippines, of northern Australia, of New Guinea and the other *quasi*-Malayan Islands that lie to the east of the Wallace line; of the Malayan Archipelago and Peninsula; of Ceylon; of Madagascar, Mauritius, the Comoro Islands, the Seychelles. At various points offshoots of this flora branch (*a*) into Polynesia, less marked perhaps than any; (*b*) from Ceylon north-westward along the coast of Malabar and the Concan, where the presence of this factor in the vegetation, though more marked than on Polynesian coasts, is not so strong as in other outlying portions of its domain; (*c*) to the east coast of Africa where the element is more strongly represented than in Malabar but is still not overwhelmingly strong; (*d*) northward along the shores of Cochin-China and Tonkin as far as the coasts of Southern China and Formosa, a few species even reaching Liu-kiu; and (*e*) strongest offshoot of all, northward along the coasts of Tenasserim and the Andamans to Arracan, Chittagong and, as our list shows, into the Sundribuns at the head of the Bay of Bengal, with the result that though certainly the most outlying part of its whole domain, this Sundribun area exhibits the features characteristic of the Flora in question on a scale and to a degree nowhere surpassed. The remarkable paucity of members of this flora on the Coromandel coast, which has nevertheless a distinctive littoral vegetation of its own, is well shown by our summary, since besides the 23 species that extend only eastward from the Sundribuns, 13 of those that extend also to Ceylon, Malabar, the Mascarenes or Africa are absent from Coromandel, as are 3 of those that are only of westward distribution; thus 42 out of

70

96 or $\frac{7}{18}$ of the sea-borne plants of the Sundribuns are absent from the Coast of Coromandel. Nor is this quite all; of the littoral species found only in the northern clearings, three-fourths, and of the littoral species found only at the sea face, three-fifths are species that occur on the Coromandel Coast, while both the saltworts, which affect muddy slopes covered by every tide, are also Coromandel plants. The proportion of species that occur within the Sundribun forests proper but are not to be found on the Coast of Coromandel is thus appreciably increased and exceeds 50 per cent. of the characteristic Flora.

V.—GUIDE TO THE GENERA.

An attempt is made in the following guide to the genera of plants that occur in the Sundribuns to provide a key sufficiently simple for use by Forest officers and their subordinates at most seasons of the year.

In using this key it is essential that in each case *both* the contrasting statements given for one of the numbers on the left-hand side of the page should be carefully read before deciding to which of the two categories a plant belongs. This done, the number printed in italics against the categorical statement on the right-hand side of the page carries the student to the proper passage. For example, a species is found to possess flowers; we pass to 2 : it is not a grass or a sedge; we pass to 29 : it is not a floating or submerged aquatic; we pass to 44 : it is neither epiphytic nor parasitic; we pass to 59 : it has no tendrils; we pass to 71 : the leaves are not gland-dotted; we pass to 81 : the leaves have distinct leaf-blades; we pass to 83 : the leaves are compound; we go on with 84 : they are opposite; we pass to 124 : the leaflets are digitate; we know the plant to be a *Vitex*. Which *Vitex* it is we learn on turning to the 139th genus in the *Systematic List* where the differential characters of the species of this genus hitherto met with in the Sundribuns are given.

1. Plants with distinct flowers *2*
   Plants without flowers (*Ferns* and *Fern-Allies*) . . *237*
2. Plants with grassy stems; leaves with a distinct leaf-sheath, sometimes only the sheath present; flowers in spikelets in the axils of glumes (*Sedges* and *Grasses*) . . *3*
   Plants with woody or herbaceous stems, or if the stems grassy (*Bulrushes*) the flowers then not in spikelets . *29*
3. Leaves 3-ranked, rarely without leaf-blades, the sheaths closed in front; fruit a small nut with the seed free inside; flowers with a glume only (*Sedges*) . *4*

Leaves 2-ranked, the sheaths open in front and with a ligule at the top behind; fruit a grain with seed adnate to pericarp; flowers between a glume and a palea (*Grasses*) 12
4. Sedges with leaf-blades unarmed, sometimes absent; nuts minute and not 6 ribbed 5
Sedges with leaf-blades spiny on edges and mid-rib beneath; nuts large, black, hard, 6-ribbed *215. Scirpodendron.*
5. Intermediate glumes of a spikelet containing hermaphrodite flowers usually numerous, always more than the 1-2 lowest empty glumes 6
Intermediate glumes of a spikelet containing hermaphrodite flowers always few, never more numerous than the 2 or more lowest empty glumes . . . *214. Cladium.*
6. Flowering glumes 2-ranked 7
Flowering glumes arranged spirally 10
7. Spikelets arranged in an open inflorescence . . . 8
Spikelets densely clustered in a close head; rachilla of the spikelet deciduous . . . . *207. Kyllinga.*
8. Rachilla of the spikelet persistent 9
Rachilla of the spikelet deciduous . . *210. Mariscus.*
9. Fruit flattened laterally . . . . *208. Pycreus.*
Fruit 3-cornered or flattened dorsally . . *209. Cyperus.*
10. (6) Base of style constricted or jointed above the fruit 11
Base of style continued into the fruit . . *213. Scirpus.*
11. Stem leafy below . . . . *212. Fimbristylis.*
Stem leafless . . . . . . *211. Eleocharis.*
12. (3) Stamens 6 13
Stamens not more than 3 14
13. Glumes firm and chartaceous . . . *221. Oryza.*
Glumes thin and membranous . . . *222. Leersia.*
14. (12) Spikelets deciduous from their pedicels or falling with them; perfect spikelets with 2 heteromorphous florets, the upper hermaphrodite, the lower male or neuter . 15
Spikelets continuous with their pedicels and breaking off so as to leave the persistent or subpersistent glumes on the pedicel, or if falling entire not composed of 2 heteromorphous florets 23
15. Rachis not continued beyond terminal spikelet . . 16
Rachis continued beyond the terminal spikelet *220. Chamæraphis.*

16. Spikelets in continuous spikes, racemes or panicles; outer glumes not firmer than flowering glumes, the lowest smallest sometimes very small or obsolete . . . *17*
Spikelets in pairs, one sessile, the other pedicelled, or the terminal 3-nate or solitary; outer glumes firmer than the flowering glumes, the lowest longer than the florets *21*

17. Spikelets not subtended by a whorl of bristles . . . *18*
Spikelets subtended by a whorl of bristles . *219. Setaria.*

18. Spikelets 2-flowered, the upper hermaphrodite, the lower male or barren, separating from their pedicels . . *19*
Spikelets 1-flowered, deciduous with the pedicels *223. Zoysia.*

19. Lowest glume obsolete, *i.e.*, only 3 glumes present . . *20*
Lowest glume present, *i.e.*, glumes 4 . . *218. Panicum.*

20. Spikelets not thickened at the base . . *216. Paspalum.*
Spikelets thickened at base . . . . *217. Eriochloa.*

21. (16) Spikelets similar *22*
Spikelets dissimilar . . . . . *226. Andropogon.*

22. Stamens 3 . . . . . . *225. Saccharum.*
Stamens 2 . . . . *224. Imperata.*

23. (14) Spikelets panicled or if spicate not secund . . *24*
Spikelets 2-seriate and secund *27*

24. Spikelets 2-more-flowered *25*
Spikelets 1-flowered . . . . . *227. Sporobolus.*

25. Spikelets without silky hairs *26*
Spikelets with glabrous glumes, but penicillate with long silky hairs on the rachilla . . . *230. Phragmites.*

26. Outer glume shorter than the lowest flowering glume; grain minute . . . . *231. Eragrostis.*
Outer glume longer than the lowest flowering glume; grain broad . . . . *232. Myriostachya.*

27. (23) Spikelets digitate or whorled *28*
Spikelets on the long, slender, spiciform branches of an elongated simple panicle . . . . . *233. Diplachne.*

28. Spikelets 1-flowered . . . . . . *228. Chloris.*
Spikelets more than 1-flowered . . . *229. Eleusine.*

29. (2) Aquatic plants, floating or submerged . . . *30*
Land plants or, if growing in water, not submerged under normal conditions; leaves and stems not floating . *44*

30. Leaves and stems floating, with roots from base or nodes suspended in the water *31*
Leaves and stems submerged; roots attached to soil . *34*

31. Stems more or less elongated, with leaves and roots at nodes separated by distinct internodes *32*
Stems very short, with a rosette of clustered leaves above and a tuft of roots below . . . *204. Pistia.*

32. Leaves alternate *33*
Leaves whorled; small plants with articulate stems and almost transparent leaves . . . *61. Aldrovanda.*

33. Flowers small, white . . . . . *116. Limnanthemum.*
Flowers rather large, purplish . . . . *123. Ipomœa.*

34. (30) Plants submerged only at high-tides *35*
Plants in still water, always submerged *37*

35. Shrubs or herbs with leafless, fleshy, jointed stems; flowers not in spathes *36*
Herbs with buried rootstock and tufted linear-lanceolate leaves; flowers on a spadix enclosed in a tubular spathe septate within . . . . . *203. Cryptocoryne.*

36. Flowers in sessile cone-like spikes . *149. Arthrocnemum.*
Flowers sunk in cavities in joints of stem . . *148. Salicornia.*

37. (34) Flowers at or above the surface of the water . . *38*
Flowers as well as leaves submerged *42*

38. Flowers white, solitary on a scape *39*
Flowers yellow, in racemes rising above the surface of the water . . . . *131. Utricularia.*

39. Stemless plants; leaves all radical *40*
Stem leafy throughout *41*

40. Perianth single; fruit on a slender spiral scape, not winged; male spathes disarticulating . *177. Vallisneria.*
Perianth double; fruit on a stoutish scape, winged *178. Ottelia.*

41. (39) Leaves whorled . . . . . . *175. Hydrilla.*
Leaves alternate . . . . . . *176. Lagarosiphon.*

42. (37) Stamens 1-2; leaves linear *43*
Stamens numerous; leaves cut into many filiform, toothed lobes . . . . . . *174. Ceratophyllum.*

43. Leaves entire; stamens 2 . . . . . *205. Ruppia.*
Leaves toothed; stamen 1 . . . . . *206. Naias.*

44. (29) Plants growing epiphytically or parasitically on the stems or branches of other species *45*
Plants rooted in the ground *59*

45. Leafless twining parasites with long slender stems . . *46*
Leafy not twining partial parasites or epiphytes . . *47*

46. Stems and flowers green; stamens 9 . . . *153. Cassytha.*
Stems yellowish, flowers white; stamens 5 . *124. Cuscuta.*

47. (45) Leaves opposite; flowers regular or nearly so . . *48*
Leaves alternate or leaf solitary; flowers irregular (*Orchids*) *51*
48. Juices milky; non-parasitic *49*
Juices watery; parasitic *50*
49. Corolla medium, rotate; flowers in stalked umbels *114. Hoya.*
Corolla, small, urceolate; flowers in axillary fascicles *113. Dischidia.*
50. (48) Leaves usually broad, penninerved; flowers hermaphrodite . . . . *154. Loranthus.*
Leaves rather narrow, 3-nerved from the base; flowers 1-sexual . . . . . . *155. Viscum.*
51. (47) Leaf solitary at apex of a rounded pseudobulb . *52*
Leaves more than one, on a usually elongated stem . *53*
52. Flowers in umbels; lateral sepals under the lip, longer than the dorsal . . . . . . *181. Cirrhopetalum.*
Flowers solitary; sepals all equal, spreading . *182. Trias.*
53. (51) Leaves terete *54*
Leaves flattened or compressed *55*
54. Lip not spurred . . . . *183. Luisia.*
Lip spurred . . . . . . *185. Sarcanthus.*
55. (53) Leaves flattened with an upper and a lower surface or, if laterally compressed and equitant, with sheath about as long as blade and flowers axillary *56*
Leaves compressed, equitant, sheath shorter than blade; and flowers many, minute, in a narrow raceme *179. Oberonia.*
56. Stems not tufted, roots few, large, issuing at intervals from side of stem, leaves flat or channeled, coriaceous; lip spurred *57*
Stems tufted; roots many, clustered at base; leaves flat, thin; or short, equitant and fleshy; lip with only a short mentum . . . . . . *180. Dendrobium.*
57. Spur of the lip partially occluded *58*
Spur of the lip with neither occluding calli nor a septum within . . . . . *184. Saccolabium.*
58. Spur occluded by calli but with no septum *186. Cleisostoma.*
Spur partially occluded by calli and with besides a vertical antero-perterior septum dividing it into two lateral chambers . . . . . . *185. Sarcanthus.*
59. (44) Plants climbing by means of tendrils *60*
Plants without tendrils *71*
60. Tendrils forming part of a leaf *61*
Tendrils not forming part of a leaf *63*

61. Leaves compound; tendrils a continuation of main rachis 62
Leaves simple, the tendrils the spirally curled tips of the leaf-blades . . . . . . .194. *Flagellaria.*
62. Leaves once divided, leaflets 2; fruits in clusters of feathery achenes . . . . . . *1. Naravelia*
Leaves twice compound, leaflets several; fruits of very large pods . . . . *59. Entada.*
63. (60) Leaves simple or only once divided; fruit indehiscent or opening by a stopple 64
Leaves twice 3-nately compound; fruit a bladder-like 3-celled capsule . . . . *31. Cardiospermum.*
64. Flowers with no corona between petals and the stamens . 65
Flowers with a distinct corona interposed between petals and stamens . . . . . . *73. Passiflora.*
65. Stamens and pistil in different flowers 66
Stamens and pistils in the same flower; leaves simple or once divided . . . . *29. Vitis.*
66. Tendrils branched 67
Tendrils simple 68
67. Petals with margins entire . . . . . *75. Luffa.*
Petals with margins fimbriately divided . *74. Trichosanthes.*
68. (66) Corolla divided nearly to base into 5 equal petals . 69
Corolla campanulate with lobes only divided about half-way down . . . . *78. Cephalandra.*
69. Anther-cells folded sigmoidly 70
Anther-cells straight or, if curved, not sigmoid *79. Zehneria.*
70. Staminate flowers racemed . . . *76. Momordica.*
Staminate flowers clustered or solitary . . *77. Cucumis.*
71. (59) Leaves dotted with embedded glands . . . 72
Leaves not dotted with embedded glands . . . 81
72. Leaves alternate; trees or shrubs 73
Leaves opposite, simple 77
73. Leaves simple 74
Leaves compound 75
74. Stem unarmed; fruit a narrow, curved capsule *99. Ægiceras.*
Stem spinous, scandent; fruit globose, umbonate, indehiscent . . . . *22. Paramignya.*
75. (73) Leaflets alternate; stamens 10 or fewer 76
Leaflets an opposite pair with one terminal; stamens 30 or more . . . . *23. Ægle.*
76. Leaflets 3-5 . . . . *20. Glycosmis.*
Leaflets 9-15 . . . . *21. Micromelum.*

77. (72) Herbs; corolla gamopetalous *78*
Trees; petals free . . . . *67. Eugenia.*
78. Fruit of 4 small nutlets with a single seed in each . . *79*
Fruit a 2-celled many-seeded capsule . *127. Limnophila.*
79. Calyx with upper tooth not exceeding the others; stamens ascending under the upper lip *80*
Calyx with upper tooth decurrent, much exceeding the others; stamens declinate . . . *142. Ocimum.*
80. Upper lip of corolla flat . . . *143. Anisomeles.*
Upper lip of corolla vaulted, densely villous on back *144. Leucas.*
81. (71) Leaves very minute and scale-like *82*
Leaves with a quite distinct leaf-blade *83*
82. Tall trees; branches, green, cylindric, jointed; nodes with sheaths of connate subulate scales . . *173. Casuarina.*
Small trees with many close-set but not connate, alternate imbricating scale-like leaves . . . *10. Tamarix.*
83. (81) Leaves compound *84*
Leaves simple *125*
84. Leaves alternate *85*
Leaves opposite *124*
85. Leaves digitate *86*
Leaves pinnate *92*
86. Stems not climbing or twining *87*
Stems twining; leaf axils bulbiferous . . *190. Dioscorea.*
87. Leaflets 3 only *88*
Leaflets more than 3 . . . . *91*
88. Shrubs or herbs *89*
Trees . . . . *6. Cratæva.*
89. Stems erect *90*
Stems prostrate . . . . . . *19. Oxalis.*
90. Leaflets without resinous glands below . . *36. Crotalaria.*
Leaflets with resinous glands below . . *48. Flemingia.*
91. (87) Flowers yellow . . . . . . *4. Cleome.*
Flowers purplish to white . . . *5. Gynandropsis.*
92. (85) Leaflets 3 only *93*
Leaflets more than 3 . . . . *102*
93. Stems erect *94*
Stems prostrate or climbing *97*
94. Stems woody *95*
Stems herbaceous; hairs fixed by their centres *37. Cyamopsis.*
95. Stem unarmed *96*
Stem armed with conical prickles . . . *43. Erythrina.*

96. Fruit fleshy, 1-2-lobed; leaflets toothed . . *32. Allophylus.*
Fruit a lomentum, breaking up into indehiscent joints; leaflets entire . . . . *39. Desmodium.*
97. (93) Stems herbaceous; pods without stinging hairs *98*
Stems woody; pods with stinging hairs . . *42. Mucuna.*
98. Leaves not glandular beneath *99*
Leaves with superficial resinous glands among the hairs beneath . . . . . . *47. Atylosia.*
99. Stamens monadelphous *100*
Stamens diadelphous *101*
100. Flowers small; pods thin, narrow; alternate stamens abortive . . . . *41. Teramnus.*
Flowers large; pods thick, wide; all the stamens with perfect anthers . . . . *44. Canavalia.*
101. (99) Keel spirally twisted . . . . *45. Phaseolus.*
Keel obtuse, not spirally twisted . . . *46. Vigna.*
102. (92) Leaves unequally pinnate *103*
Leaves even-pinnate *114*
103. Flowers on spadices covered by spathes; woody stems with the vascular bundles isolated and scattered (*Palms*) . *104*
Flowers not on spadices; woody stems with vascular bundles in concentric rings *109*
104. Stems erect, or stem very short and leaves tufted . . *105*
Stems scandent with the aid of retrorse hooks . . . *108*
105. Leaflets with reduplicate sides *106*
Leaflets induplicate; stems long, slender . *197. Phœnix.*
106. Stems elongated, with a terminal tuft of leaves . . *107*
Stems very short, with a tuft of very large leaves close to the ground . . . . *195. Nipa.*
107. Stems straight, slender; fruits numerous, never more than 2 in. long . . . . *196. Areca.*
Stems rather crooked, stout; fruits fewer, always more than 8 in. long . . . . *200. Cocos.*
108. (104) Spathe tubular, persistent . . . *198. Calamus.*
Spathe cymbiform, deciduous . . *199. Dæmonorops.*
109. (103) Leaflets opposite *110*
Leaflets alternate . . . . . . *49. Dalbergia.*
110. Leaflets once pinnate *111*
Leaflets more than once pinnate . . . . *30. Leea.*
111. Erect trees *112*
Climbing shrubs . . . . . *51. Derris.*

112. Roots without root-suckers ; fruit indehiscent . . . *113*
Roots with vertical blind root-suckers ; fruit a subglobose, 2-3-celled capsule . . . . *24. Amoora.*
113. Fruit a small compressed drupe with a hard stone ; leaves few, at ends of branches . . . . . *35. Odina.*
Fruit a coriaceous, indehiscent 1-seeded pod ; leaves scattered, many . . . . . *50. Pongamia.*
114. (10) Leaves once pinnate ; unarmed species . . . *115*
Leaves more than once pinnate ; species armed with spines or thorns or prickles *121*
115. Stems erect *116*
Stems twining . . . . *40. Abrus.*
116. Fruit a pod, dehiscent or indehiscent *117*
Fruit a large, globose, 4-valved capsule . . *25. Carapa.*
117. Petals 5 . . . . *118*
Petals fewer than 5 . . . . *120*
118. Stamens free ; petals equal, the upper inmost . . . *119*
Stamens united nine below in a sheath, one upper free ; petals unequal, irregular, the upper the outmost *38. Sesbania.*
119. Anthers large, often unequal, only seven perfect, opening by apical pores . . . . . . *55. Cassia.*
Anthers small, opening by lateral slits . . *56. Cynometra.*
120. (117) Petals 3 ; stamens 3, filaments short, united ; pod pulpy indehiscent . . . . . *57. Tamarindus.*
Petal solitary ; stamens 3, filaments long, free ; pod dry, dehiscent . . . . *58. Intsia.*
121. (114) Flowers medium, in racemes or panicles ; petals free ; stamens 10 . . . . *122*
Flowers minute, in globose heads ; petals united below ; stamens more than 10 *60. Acacia.*
122. Pod flattened or swollen, but not beaded opposite the seeds ; calyx with a larger cymbiform lowest lobe . . . *123*
Pod turgid, beaded opposite the seeds ; calyx lobes all subequal . . . . . . *54. Parkinsonia.*
123. Pod broadly winged down upper suture *53. Mezoneuron.*
Pod not winged . . . . *52. Cæsalpinia.*
124. (84) Leaves digitate . . . . . . *139. Vitex.*
Leaves pinnate . . . . . . *132. Dolichandrone.*
125. (83) Flowers minute, in heads surrounded by a whorl of bracts *126*
Flowers rarely in heads, and if so not surrounded by a whorl of bracts *136*

126. Leaves alternate *127*
Leaves opposite *135*

127. Plants armed with sharp spines *128*
Plants unarmed *129*

128. Spines forked, scattered along stem; margins of leaves not spiny . . . . *94. Xanthium.*
Spines simple, on margins of the leaves . . *96. Cnicus.*

129. (127) Juice not milky *130*
Juice milky . . . . *97. Launea.*

130. Herbs *131*
Shrubs or under-shrubs . . . . *92. Pluchea.*

131. Florets yellow . . . . *132.*
Florets purple . . . . *87. Vernonia.*

132. Stems not winged . . . . *133.*
Stems winged . . . . . . *93. Sphaeranthus.*

133. Anther-cells without tails *134*
Anther-cells tailed . . . . . . *91. Blumea.*

134. Outer florets of head (ray) differing from central florets; stem erect . . . . *90. Conyza.*
Outer florets like central; stem prostrate . *89. Grangea.*

135. (126) Florets yellow . . . . . . *95. Wedelia.*
Florets purple . . . . *88. Ageratum.*

136. (125) Leaves alternate or radical only *137*
Leaves opposite *193*

137. Plants with milky juice; trees *138*
Plants with watery juice; if bitter or resinous, not milky . *142*

138. Flowers visible *139*
Flowers minute, hidden within a hollow, closed, fleshy receptacle . . . . *172. Ficus.*

139. Flowers small or minute, incomplete; perianth green . *140*
Flowers large; corolla white . . . . *102. Cerbera.*

140. Leaves smooth; juice acrid; fruit a 3-celled capsule . *141*
Leaves scabrid, juice bland; fruit covered by the persistent calyx, membranous, 1-seeded . . . *173. Streblus.*

141. Racemes terminal; leaves toothed . . . *168. Sapium.*
Racemes axillary; leaves entire . . *169. Excœcaria.*

142. (137) Leaves with a convolute leaf-sheath . . . *143*
Leaves with no distinct leaf-sheath *151*

143. Stems erect, woody; shrubs or small trees . . . *144*
Stems herbaceous, or stem none; leaves radical . . *145*

144. Leaves with orbicular blades distinct from leaf-sheaths; not prickly . . . . *98. Ægialitis.*

Leaves with linear blades passing into the leaf-sheaths; armed with prickles along the margins and the midrib beneath . . . . 201. *Pandanus*.

145. (143) Leaf-blades flattened 146

Leaf-blades linear, spongy or fistular, semi-cylindric or triquetrous; all radical 150

146. Stems above ground herbaceous, decumbent, rooting . 147

Stems underground or none, or if above ground erect . 148

147. Cymes included in a large bract . . 192. *Commelina*.

Cymes naked, paniculate . . . . 193. *Aneilema*.

148. (146) Leaves on an erect pseudo-stem formed of clasping leaf-sheaths 149

Leaves radical; flowers large, umbellate . 189. *Crinum*.

149. Flowers in a panicle at the apex of the leafy pseudo-stem 188. *Alpinia*.

Flowers in a spike rising direct from root-stock, separate from the leafy pseudo-stem . . . 187. *Zingiber*.

150. (145) Flowers distinct, white, racemose; scape slender; field-weeds . . . . . . 191. *Asphodelus*.

Flowers minute, close-set on a cylindric spike; large aquatic plants (*Bulrushes*) growing on edges of ponds and streams . . . . 202. *Typha*.

151. (142) Petals or perianth-segments united in a gamopetalous corolla 152

Petals never united, often not present 161

152. Corolla regular, its base surrounded by a calyx . . 153

Corolla (perianth) irregular; calyx absent 152. *Aristolochia*.

153. Erect trees 154

Herbs or climbing under-shrubs or shrubs . . . 155

154. Stamens 5 or 6 . . . . 118. *Cordia*.

Stamens 16 or more . . . . . 106. *Diospyros*.

155. (153) Stems prostrate or, if twining, unarmed . . . 156

Stems erect or, if climbing, prickly 159

156. Flowers large, stalked, pink to purple; stems twining or if prostrate the leaves not lying flat on the ground and not crispate 157

Flowers small, sessile, white; stems and crispate leaves both close to ground . . . . . 119. *Coldenia*.

157. Sepals coriaceous but not so enlarged in fruit as to hide the capsule 158

Sepals fleshy and mucilaginous in fruit, quite concealing the capsule . . . . 121. *Stictocardia*.

158. Pollen spinulose . . . . *123. Ipomœa.*
Pollen not spinulose . . . . . *122. Merremia.*
159. (155) Inflorescence of lax racemes, cymes, or umbels . *160*
Inflorescence of dense spikes . . *120. Heliotropium.*
160. Fruit a capsule . . . . . *117. Hydrolea.*
Fruit a berry . . . . *125. Solanum.*
161. (151) Plants prickly or spiny or thorny *162*
Plants unarmed *165*
162. Sarmentose or semi-erect; armed with thorns or prickles *163*
Erect; armed with rigid spines . . . *8. Flacourtia.*
163. Fruit sessile above the calyx; stamens not more numerous than petals *164*
Fruit stipitate on a carpophore; stamens more numerous than petals; thorns of modified stipules . *7. Capparis.*
164. Leaves glabrous; plant armed with few prickles . *26. Olax.*
Leaves more or less hairy; plant armed with numerous stipular thorns . . . . . . *28. Zizyphus.*
165. (161) Stems sarmentose or twining *166*
Stems erect *170*
166. Flowers small or very small, greenish *167*
Flowers large, showy, yellow . . . *13. Hibiscus.*
167. Stems woody, rather stout; flowers all 1-sexual . . *168*
Stems herbaceous *169*
168. Stamens numerous; fruit a capsule . . . . *167. Mallotus.*
Stamens 5; fruit a small drupe . . . *157. Bridelia.*
169. (167) Flowers 1-sexual; stamens 6; carpels 3, free; seeds curved . . . . *2. Tinospora.*
Flowers 2-sexual; stamens 5; ovary 1-celled . *151. Basella.*
170. (165) Trees or large woody shrubs *171*
Herbs or small under-shrubs *182*
171. Leaves with margins quite entire *172*
Leaves with margins toothed *180*
172. Leaves subcordate, palminerved at the base . . . *173*
Leaves oblong to lanceolate, penninerved . . . *174*
173. Flowers large, showy, yellow . . . *14. Thespesia.*
Flowers medium, rose-coloured . . . *16. Kleinhovia.*
174. (172) Fruit not crowned by the calyx *175*
Fruit crowned by the remains of the calyx . *66. Lumnitzera.*
175. Leaves with silvery scales beneath; ripe carpels free . *176*
Leaves glabrous or hairy but not scaly beneath; ripe carpels united *177*
176. Petals 5 . . . . *17. Brownlowia.*
Petals 0 . . . . *15. Heritiera.*

177. (175) Leaves glabrous beneath *178*

Leaves tomentose beneath . . . *162. Antidesma.*

178. Petals o *179*

Petals 5, each with a basal scale . . . *33. Aphania.*

179. Stamens 3, united in a central column . . *160. Breynia.*

Stamens 6 or more, free . . . *161. Cyclostemon.*

180. (171) Flowers small, 1-sexual; fruit not crowned by the remains of the calyx *181*

Flowers large, 2-sexual; fruit large, indehiscent with the calyx-lobes persistent on its apex . *69. Barringtonia.*

181. Stamens 10-12; sepals clothed with flat scales; fruit a 3-celled capsule . . . . *163. Croton.*

Stamens 3-5; sepals hairy but without scales; fruit minute, 1-seeded . . . . *170. Trema.*

182. (170) Petals o or, if present, similar in size and shape . *183*

Petals large, dissimilar and very irregular, the uppermost outmost . . . . . . *36. Crotalaria.*

183. Stamens united *184*

Stamens free *188*

184. Flowers conspicuous; petals yellow; stamens many, in a tube round the style; flowers 2-sexual . . . *185*

Flowers very small, green, 1-sexual; petals o . . . *186*

185. Styles as many as the carpels . . . *11. Abutilon.*

Styles twice as many as the carpels . . *12. Malachra.*

186. (184) Stamens 3 only, united in a central column . . *187*

Stamens 5-15, united in whorls . . *164. Chrozophora.*

187. Sepals of male flowers with white margins . *158. Agyneia.*

Sepals green . . . . . . *159. Phyllanthus.*

188. (183) Flowers yellow *189*

Flowers white or green, very small *190*

189. Stamens 10 or more; flowers small . . *18. Corchorus.*

Stamens 5; flowers large . . . . *72. Turnera.*

190. (188) Leaves entire or toothed, not lobed; petals o . *191*

Leaves deeply pinnatifidly divided; sepals 4; petals 4; stamens 6 . . . . *3. Senebiera.*

191. Leaves broad, membranous *192*

Leaves narrow, fleshy; sepals 5; ~~stamens~~ 5 . *150. Suæda.*

192. Stamens 5 or fewer; leaves not toothed; sepals scarious; fruit 1-celled . . . . . . *145. Amarantus.*

Stamens 8 or more; leaves toothed; sepals herbaceous, united; fruit 3-celled . . . . *165. Acalypha.*

193. (136) Juices milky *194*

Juices not milky *204*

194. Stipules wanting ; fruit 2-follicular *195*
Stipules present, minute ; fruit 3-celled . . *156. Euphorbia.*
195. Stems twining *196*
Stems erect . . . . *107. Calotropis.*
196. Seeds with a pencil of hairs (coma) *197*
Seeds without hairs . . . . *110. Sarcolobus.*
197. Corolla with a corona in the throat *198*
Corolla throat naked . . . . . *103. Parsonsia.*
198. Filaments of stamens united *199*
Filaments free *203*
199. Corona single, staminal only *200*
Corona double, coro'line and staminal . . *106. Oxystelma.*
200. Corolla rotate *201*
Corolla funnel-shaped . . . . . . *109. Dæmia*
201. Pollen masses erect, or at least with erect pedicels . . *202*
Pollen-masses wholly pendulous . . *108. Pentatropis.*
202. Flowers green, fairly large ; pollen-masses quite erect; follicles stout . . . . . *111. Dregea.*
Flowers white, minute ; pollen-masses with only the pedicels erect ; follicles slender . . . *112. Tylophora.*
203. (198) Scales of corona short, thick . *104. Hemidesmus.*
Scales of the corona filiform. . . *105. Finlaysonia.*
204. (193) Leaves with stipules or interpetiolar nodal appendages or stipular lines *205*
Leaves without stipules or interpetiolar lines . . . *215*
205. Trees or large woody shrubs *206*
Herbs with prostrate stems and branches . . . *214*
206. Flowers 2-sexual ; corolla always present . . . *207*
Flowers diœcious ; petals 0 ; leaves palminerved *166. Trewia.*
207. Petals distinct ; embryo germinating before fruit falls (*Mangroves*) *208*
Petals united in a regular tubular corolla . . . *211*
208. Petals more than 4 ; stamens more than 8 . . . *209*
Petals 4, entire ; stamens 8 . . . . *62. Rhizophora.*
209. Calyx-segments and petals 5-6 . . . . . . *210*
Calyx-segments and petals 8-14 ; stamens 16-28 *65. Bruguiera.*
210. Petals emarginate ; stamens 10-12 ; ovary 3-celled *63. Ceriops.*
Petals lacerate ; stamens over 12 ; ovary 1-celled *64. Kandelia.*
211. (207) Branches unarmed *212*
Branches armed with axillary spines . . *84. Vangueria.*
212. Flowers quite free *213*
Flowers with the calyx-tubes agglutinated to form large fleshy heads . . . . . *86. Morinda.*

213. Flowers small, in axillary spikes . . . *83. Petunga.*
Flowers long-tubed, in terminal cymes . . . *85. Ixora.*

214. (205) Flowers white; corolla tubular; stamens 4-5; stipules connate; leaves herbaceous . . . *82. Oldenlandia.*
Flowers yellow; petals free; stamens 8 or more; stipules represented by scarious nodal appendages; leaves and stems fleshy, succulent . . . . *9. Portulaca.*

215. (204) Roots with blind vertical root-suckers . . . *216*
Roots without blind root-suckers *217*

216. Flowers large; stamens very many, rising from calyx; petals free or absent . . . . *71. Sonneratia.*
Flowers small, yellow; stamens 4, adnate to corolla; petals connate . . . . *141. Avicennia.*

217. (215) Petals united in an irregular corolla . . . *218*
Petals absent or, if present, free *229*

218. Stamens 4 perfect *219*
Stamens 1 only perfect, 3 barren; very small herbs in waste-places and fields . . . . *115. Hoppea.*

219. Fruit a 2-celled capsule with more than one seed in each of the cells *220*
Fruit with 4 or more 1-seeded cells, rarely a capsule . *226*

220. Stamens didynamous, one pair longer than the other . *221*
Stamens nearly equal in length; flowers very small, white; seeds many . . . . *130. Scoparia.*

221. Seeds hard, on rigid curved stalks (retinacula) . . . *222*
Seeds without retinacula *224*

222. Seeds more than 2 in each cell; corolla with an upper lip or posterior lobes *223*
Seeds only 2 in each cell; corolla with a 3-lobed lower lip but no upper . . . . . . *135. Acanthus.*

223. Corolla distinctly 2-lipped . . . . *133. Hygrophila.*
Corolla with 5 nearly equal lobes . . *134. Hemigraphis.*

224. (221) Corolla-tube distinct throat not saccate in front . *225*
Corolla-tube short, throat saccate in front . *126. Angelonia.*

225. Calyx-segments equal . . . . . *129. Vandellia.*
Calyx-segments unequal . . . . *128. Herpestis.*

226. (219) Flowers in capitate or ovoid spikes . . . *227*
Flowers in open cymes *228*

227. Fruit leathery, indehiscent . . . . *136. Lantana.*
Fruit dry, partially dehiscent . . . *137. Lippia.*

228. (226) Flowers very small, greenish-white . *138. Premna.*
Flowers large, white . . . . *140. Clerodendron.*

229. (217) Unarmed species *230*
Armed shrubs or under-shrubs; spines axillary *101. Azima.*

230. Trees or large shrubs; petals present *231*
Herbs; petals wanting *233*

231. Stamens 5 or fewer; fruit not tipped by the calyx . . *232*
Stamens numerous; fruit large, crowned by the persistent calyx-lobes . . . . *68. Psidium.*

232. Flowers 3-6 from small tubercles; fruit a small hard berry; rambling shrubs . . . . . . *27. Salacia.*
Flowers many, in lax panicles; fruit a compressed fleshy edible drupe; considerable trees . . *34. Bouea.*

233. (230) Stem prostrate, rooting at the nodes . . . *234*
Stems erect . . . . *70. Ammannia.*

234. Sepals connate in a short calyx; stamens free, inserted round mouth of calyx-tube *235*
Sepals free; stamens connate in a cup below ovary . . *236*

235. Capsule 3-5-celled . . . . . . *80. Sesuvium.*
Capsule 1-2-celled . . . . . *81. Trianthema.*

236. (234) Sepals hard, the outer ones 3-ribbed; stamens 5; anthers 2-celled . . . . . *146. Psilotrichum.*
Sepals herbaceous, flexible, not ribbed; stamens 2 3; anthers 1-celled . . . . *147. Alternanthera.*

237. (1) Fronds very large as compared with the stem . . *238*
Fronds small or minute *247*

238. Fronds circinate; sporangia on under-surface . . . *239*
Fronds erect; sporangia spicate in crested clusters on a separate segment . . . *243. Helminthostachys.*

239. Sori confined to margins or veins of under-side of fronds . *240*
Sori spread over whole under-surface of fertile fronds or parts of fronds . . . . . *242. Acrostichum.*

240. Epiphytic or terrestrial ferns *241*
Aquatic ferns, growing in still waters . *236. Ceratopteris*

241. Sori remote from margins of fronds *242*
Sori marginal or nearly so *244*

242. Sori covered by an indusium *243*
Sori without an indusium . . . . *239. Polypodium.*

243. Indusium reniform . . . . . *238. Nephrodium.*
Indusium oblong or linear . . . . . *237. Asplenium.*

244. (241) Sori protected by an indusium *245*
Sori without an indusium *246*

245. Sporangia attached to under-side of indusium, which consists of the intucked margin of the frond *234. Adiantum.*

Sporangia not arising from the indusium, which is distinct from the margin of the frond . . . 235. *Pteris.*

246. (244) Fronds grass-like, all similar . . 240. *Vittaria.*
Fronds dimorphic . . . . 241. *Drymoglossum.*

247. (237) Leaves many, crowded; sporangia orbicular, compressed, 1-celled, 1-valved . . 244. *Lycopodium.*
Leaves minute, distant, rudimentary; sporangia turbinate, 3-celled, 3-valved . . . . . 245. *Psilotum.*

VI.—SYSTEMATIC CENSUS OF SPECIES.

In the subjoined list of plants hitherto reported from the Sundribuns, the order followed is that of the *Flora of British India*,* which is referred to throughout; there, descriptions of the majority of the species are to be found. References are also given to Roxburgh's *Flora Indica* † for such of the species as are there described. Moreover, Watt's *Dictionary of the Economic Products of India* ‡ is cited under the species referred to in that work. These references, it is hoped, may lead to the identification of any species that it is found impossible to run down with the aid of the *Guide to the Genera* given in the preceding Chapter, and with the help of the keys to species that are given in the *Census* itself.

In the case of the Cryptogams the references are to Clarke's edition of the *Flora Indica* and to the *Synopsis Filicum*§ of Hooker and Baker. Planted or cultivated species are marked(*).

THALAMIFLORÆ.

I.—RANUNCULACEÆ.

1. Naravelia DC.

1. **Naravelia zeylanica** DC.; F. B. I. i. 7. *Atragene zeylanica* F. I. ii. 670. E. D. N 8.

Generally distributed, but not common. Northern Forests, *Calcutta Garden Collectors*! Coast at Tiger Point, *Heinig*!

Vernac. *Murcha.*

Scandent on bushes; stems sometimes twisted into ropes; root tuberous.

Distrib.—India; Indo-China; Malaya.

The common Bengali name is Chhagal-bati, which is also used to designate *Dæmia extensa.*

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* Cited as F. B. I. with volume and page.

† Cited as F. I. with volume and page.

‡ Cited as E. D. with letter and reference number.

§ Cited as Synops. Fil. with page.

II.—MENISPERMACEÆ.

2. **Tinospora** Miers.

2. **Tinospora tomentosa** Miers; F. B. I. i. 96. *Menispermum tomentosum* F. I. iii. 813.
Jatta, ruins of pagoda, *Prain* !
Vernac. *Padma-guláncha.*

Scandent; possesses the tonic properties of the common Gulóncha (*T. cordifolia*).

DISTRIB.—Lower Bengal; Lower Burma: always rare.

III.—CRUCIFERÆ.

3. **Senebiera** Poir.

3. **Senebiera pinnatifida** DC.
Banks of Mátla river, in sandy places, *Calcutta Garden Collectors* !

A diffuse procumbent annual; properties insignificant.

DISTRIB.—Temp. S. America. Apparently a recently introduced plant in India; reported from Upper Sind (*Cooke, Woodrow*) and from Banda (*Mrs. Bell*); earliest Sundribuns record, 1898.

IV.—CAPPARIDEÆ.

4. **Cleome** Linn.

4. **Cleome viscosa** Linn.; F. I. iii. 128; F. B. I. i. 170. E. D. C 1367.
Jatta, among ruins of pagoda, *Prain* !
Vernac. *Húrhúria.*

An erect annual; seeds yield an oil which, with the juice of the plant, is used for ear complaints; seeds also used as food; flowers yellow.

DISTRIB.—Cosmopolitan in tropical and subtropical regions.

5. **Gynandropsis** DC

5. **Gynandropsis pentaphylla** DC.; F. B. I. i. 171. *Cleome pentaphylla* F. I. iii. 126. E. D. G 753.
Canning Town, *Calcutta Garden Collectors* ! *Prain* !
Vernac. *Sada Húrhúria.*

An erect annual, cult. or an escape; properties much as in *Cleome viscosa*; flowers pale-purple to white.

DISTRIB.—Cosmopolitan in the tropics.

6. **Cratæva** Linn.

6 **Catæva religiosa** Forst.; F. B. I. 172.—*Capparis trifoliata* F. I. ii. 571. E. D. C 2039.

Northern forests and clearings, *Heinig*!
Vernac. *Barún*, *Tikto-shak.*

An unarmed tree; stands long leafless; properties tonic and rubefacient; flowers purplish-yellow.

Distrib.—Supposed wild in Malabar; elsewhere planted.

The presence of this in the Sundribun forests is doubtless one of the vestiges of former occupation on mounds or platforms of higher ground, *e.g.*, on the left bank of the Mandabari river.

7. **Capparis** Linn.

7. **Capparis sepiaria** Linn.; F. I. ii. 568; F. B. I. i. 177. E. D. C. 427.
Coast, *Heinig*! Jatta, *Prain*!
Vernac. *Kanta Gurkamai.*

A stout thorny climbing shrub; said to possess antiperiodic properties.

Distrib.—India; Indo-China; Malaya; Philippines.

This species is very characteristic of the sea-fence immediately behind the beaches, on the Burmese and Andaman coasts.

V.—BIXINEÆ.

8. **Flacourtia** Comm.

8. **Flacourtia sepiaria** Roxb.; F. I. iii. 835; F. B. I. i. 194. E. D. F 624.
Northern forests and clearings; Cheila Bogi river, *Heinig & Gammie*! Jatta, *Prain*!

A thorny bush; properties unimportant.

Distrib.—India; Indo-China; Malaya.

VI.—PORTULACACEÆ.

9. **Portulaca** Linn.

9. **Portulaca oleracea** Linn.; F. I. ii. 463; F. B. I. i. 246. E. D. P 1179.
Northern clearings, very rare, *Prain*!
Vernac. *Laniya.*

A prostrate succulent annual; a fair vegetable.

Distrib.—Cosmopolitan in the tropics.

VII.—TAMARISCINEÆ.

10. **Tamarix** Linn.

10. **Tamarix gallica** Linn. var. **indica** Dyer; F. B. I. i. 248. *T. indica* F. I. ii. 100. E. D. T 70.

Everywhere on river-banks from the northern forests to sea-face; especially plentiful in recent clearings.

Vernac. *Jhao*; *Nuna gách.*

A shrub or small tree, up to 20 feet high; cut for firewood: the galls and bruised twigs provide an indifferent tan.

DISTRIB.—Shores of W. and S. Europe; N. and Trop. Africa; S.-E. Asia.

VIII.—MALVACEÆ.

11. Abutilon Gaertn.

Leaves and branches white with closely felted down; flowers yellow; capsules almost glabrous . . . . *indicum.*

Leaves and branches hispid with spreading hairs; flowers orange; capsules hairy . . . . *graveolens* var. *hirtum.*

11. **Abutilon indicum** G. Don; F. B. I. i. 326. *Sida indica* F. I. iii. 179. E. D. A 89.

Northern clearings, rare, *Calcutta Garden Collectors*! *Prain*!

Vernac. *Potári*, *Kanghi.*

A shrubby weed; stems give a tolerable fibre; juices demulcent and diuretic; seeds said to be laxative.

DISTRIB.—Cosmopolitan, or nearly so, in the Tropics.

12. **Abutilon graveolens** G. Don. VAR. **hirtum** Mast.; F. B. I. i. 327.—*Sida graveolens* F. I. iii. 179. E. D. A 84.

Northern clearings, very rare, *Calcutta Garden Collectors*!

Vernac. *Bar Potári*, *Bara Kanghi.*

A shrubby weed with a heavy odour; properties as in *A. indicum.*

DISTRIB.—Tropical and subtropical regions of the Eastern Hemisphere and Australia.

12. Malachra Linn.

13. **Malachra capitata** Linn.; F. B. I. i. 329. E. D. M 60.

In all the northern clearings, plentiful.

Vernac. *Ban Bhindi*, *Ban Dheras.*

An erect annual, apparently recently introduced to India; yields a soft and silky but apparently not very valuable fibre.

DISTRIB.—Tropical America; also Tropical West Africa, but there, as in India, probably introduced.

13. Hibiscus Med.

Free portion of bracteoles twice the length of their cupular base; carpels 2-locular at their bases only; stipules large, spathulate; flowers yellow with rose-pink veins . . . *tortuosus.*

Free portion of bracteoles much shorter than their cupular base; carpels completely 2-locular throughout; stipules medium, lanceolate; flowers yellow with crimson eye, changing to brownish red . . . . *tiliaceus.*

14. **Hibiscus tortuosus** Wall. (not of Roxb.).

"Estuary of the Hughli," *Wallich* (*Catalogue* n. 1913 A: 1817)!

This plant has only once been collected in an apparently wild state. It grows well in the Calcutta Gardens, where there are some old and large specimens. It has the habit, the pubescence, and much the appearance of *H. tiliaceus*, but has the large stipules and exactly the flowers of *H. macrophyllus* which is, however, a tree, sometimes of considerable size. The fruit, which forms freely, is curiously intermediate between the fruit of *H. tiliaceus* and *H. macrophyllus*. In *H. tiliaceus* the five carpels are each completely subdivided by accessory partitions into 10 chambers; in *H. macrophyllus* the five carpels show no trace of such subdivision. In *H. tortuosus* there are partial dissepiments in each carpel. This intermediate character, with the fact that in the Calcutta Garden the seeds of *H. tortuosus* are always abortive, gives rise to the suspicion that we may have here to do with a natural hybrid between *H. tiliaceus*, the common *Bhola* and *H. macrophyllus* which, though not a Sundribun plant, occurs in Chittagong. In any case *H. tortuosus* should be looked for, more especially in the eastern parts.

15. **Hibiscus tiliaceus** Linn.; F. I. iii. 192; F. B. I. i. 343. *H. tortuosus* F. I. iii. 192. *H. tiliaceus* var. *tortuosus* F. B. I. i. 343. E. D. H 255.

Plentiful everywhere, from the northern border to the sea-face.

Vernac. *Bhola*, *Chelwa*.

A heavy climber, injurious to forest growth: the inner bark yields a strong fibre, used by the wood-cutters for cordage.

DISTRIB.—Cosmopolitan on tropical coasts.

14. Thespesia Corr.

16. **Thespesia populnea** Corr.; F. B. I. i. 345. *Hibiscus populneus* F. I. iii. 190. E. D. T. 392.

Coast; at Tiger Point, *Heinig*! but chiefly west of the Raimangal river (*Heinig*).

Vernac. *Dumbla* (*Heinig*); *Paras*; *Paras Pipal*.

A handsome tree, reaching 30 feet in height; wood good; inner bark yields a fair fibre; capsules give a yellow dye.

DISTRIB.—Tropical sea-coasts of the Eastern Hemisphere.

IX.—STERCULIACEÆ.

15. Heritiera Ait.

17. **Heritiera minor** Roxb.; F. I. iii. 142. *H. Fomes* F. B. I. i. 363. E. D. H 134.

Everywhere from the northern forests to the sea.
Vernac. *Sundri.*

A small to medium tree, reaching 40-50 feet in height; wood excellent, hard, tough and durable, red in colour; used in boat-building, also for posts, planks, rafters, jhools and dabbas of boats, furniture and firewood; trunk often much buttressed; roots send up vertical blind suckers; charcoal obtained from this tree is used by gold and silver-workers.

DISTRIB.—Delta of the Irrawaddy and (*fide* Masters *in F. B. I.*) Borneo.

Heritiera littoralis *Dryand.*, stated in the F. B. I., and in various other works on Indian Botany, to occur on the coasts of Bengal, has never been collected in the Sundribuns.

16. **Kleinhovia** Linn.

18. **Kleinhovia Hospita** Linn., F. I. iii. 141; F. B. I. i. 364. E. D. K 27.
Sundribuns, *Ellis*!
Vernac. *Bhola.*

A tall handsome tree; bark provides coarse rope (*Ellis*).

DISTRIB.—E. Tropical Africa; Malaya; Philippines.

Unfortunately Mr. Ellis, who alone has sent Sundribun specimens of this tree, does not give a precise locality. The species was not introduced to the Calcutta Garden, from the Moluccas, till 1798; it can hardly then be a species in some now abandoned clearing. The tree does not occur in existing clearings; the distribution of the species is precisely that of many of the species truly wild in the Sundribuns; there is, therefore, nothing against *Kleinhovia* being a genuine Sundribun plant. At all events the tree deserves to be carefully looked for again.

X.—TILIACEÆ.

17. **Brownlowia** Roxb.

19. **Brownlowia lanceolata** Benth.; F. B. I. i. 381. E. D. B 895.
Widely disseminated but nowhere very plentiful; chiefly found on the banks of creeks and rivers, *Griffith*! *Heinig*! *Prain*!
Vernac. *Kedar Sundri; Bhola Sundri.*

A small to medium tree, in leaf rather resembling *Sundri*; wood used as fuel.

DISTRIB.—Tenasserim.

18. **Corchorus** Linn.

20. **Corchorus acutangulus** Lamk.; F. B. I. i. 398. *C. fuscus* F. I. ii. 582. E. D. C 1840.
Northern clearings, not common, *Clarke*! *Prain*!
Vernac. *Titapát.*

An annual herb, rather resembles jute; properties unimportant.

DISTRIB.—Tropics of Eastern Hemisphere; West Indies.

DISCIFLORÆ.

XI.—GERANIACEÆ.

19. Oxalis Linn.

21. **Oxalis corniculata** Linn.; F. I. ii. 457; F. B. I. i. 436. E. D. O 547.

Northern clearings, very rare, *Heinig & Gammie*!

Vernac. *Chuka Tripati; Amrul.*

A small weed of cultivated ground with 'trefoil' leaves; properties not very important; slightly acid and refrigerant or tonic; sometimes used as a vegetable.

DISTRIB.—Cosmopolitan in cultivated ground.

XII.—RUTACEÆ.

20. Glycosmis Corr.

22. **Glycosmis pentaphylla** Corr.; F. B. I. i. 499. *Limonia pentaphylla* F. I. ii. 381. E. D. G 271.

Northern clearings, *Calcutta Garden Collectors*! ruins of Mandabari, *Heinig & Gammie*! ruins of Jatta, *Prain*!

Vernac. *Ashhoura.*

A shrub, evergreen; fruit eaten; twigs used as tooth-cleaners.

DISTRIB.—S.-E. Asia; Australia.

This species is a common constituent of village shrubberies in the Gangetic plain and is an almost certain indication, when it occurs elsewhere, of former human habitation.

21. Micromelum Bl.

23. **Micromelum pubescens** Bl.; F. B. I. i. 501. *Bergera integerrima* F. I. ii. 376.

Eastern Sundribuns, *fide Roxburgh.*

Vernac. *Ban-kunch.*

A small, much-branched tree.

DISTRIB.—S.-E. Asia; Polynesia.

Roxburgh says that the tree occurs on the eastern banks of the mouth of the Megna; it might, therefore, be looked for on the opposite or western banks, from Shabuzpur northwards.

22. Paramignya Wight.

24. **Paramignya longispina** Hook. f.; F. B. I. i. 511.

Eastern Sundribuns, at Baniakhali, *Heinig*!

Vernac. *Ban Nimbu.*

A thorny under-shrub; fruit used in cases of colic.

DISTRIB.—Malayan Peninsula.

23. **Ægle** Corr.

25. **Ægle Marmelos** Corr.; F. I. ii. 579; F. B. I. i. 516. E. D. A 534.
Jatta, among the ruins, *Prain*!
Vernac. *Bél*, *Vilva*.

A medium to large tree; yields a gum; also a dye from the rind of the fruit; timber white, hard but not durable; fruit medicinal, when unripe astringent, when ripe cooling and mildly laxative; used in dysentery. The tree is sacred; this perhaps explains its existence beside an abandoned temple.

DISTRIB.—Drier parts of India.

XIII.—MELIACEÆ.

24. **Amoora** Roxb.

26. **Amoora cucullata** Roxb.; F. B. I. i. 560. *Andersonia cucullata* F. I. ii. 212. E. D. A 983.
General, in swamp-forests, from the northern border to the sea-face.
Vernac. *Amúr; Latmi, Natmi.*

A considerable tree, 30-40 feet high; wood hard, apt to split, of red or brown colour, used for posts and fuel; leaves when bruised applied to reduce inflammation; roots with vertical blind suckers.

DISTRIB.—Andamans; Malay Peninsula.

25. **Carapa** Aubl.

Roots with vertical blind suckers; evergreen; bark smooth; flowers February-March; fruits the size of an orange *moluccensis* var. *gangetica*.

Roots with no root-suckers; deciduous; bark rough; flowers most of the year; fruits the size of a shaddock . . . *obovata*.

27. **Carapa moluccensis** Lamk VAR. **gangetica**.
Forests east of the Arpangassia, in swampy localities, *Heinig*! *Lace*!
Vernac. *Pussur*.

A tree 60 feet high; leaves fall after the new flush so that the species is practically evergreen; bark dark-brown, moderately exfoliating, deep-red within; wood white, reddening on exposure, hard, used for tool-handles, hand-spikes, helves, wheel-spokes, house-posts, planking; withstands moisture. The tree exudes a clear, brown, brittle gum: the fruit yields an illuminating and lubricating oil. The roots send up copious blind root-suckers.

This is, at least, a very distinct variety of *C. moluccensis* and may prove to be a distinct species; the shape of the leaflets is different, though the texture is much the same. The flowers, however, are the same in size and structure and it further agrees with typical *C. moluccensis* in the size of its fruit and in its habit of sending up blind root-suckers. In the Sundribuns this tree affects only the lowest parts of the interior of the swampy islands. The leaflets, though with more rounded bases than those of *C. obovata*, and though of distinctly thinner texture, nevertheless more resemble these in general shape than they do the leaflets of any hitherto known variety of *C. moluccensis*. They are more obtuse at the apex than is the case with *C. moluccensis* var. *elliptica* Koord. & Val.; our tree further differs from that well-marked form in having only 2—1-jugate leaves, just as in *C. obovata*, never 3-jugate leaves. The form most nearly related to var. *gangetica* appears to be the Java tree named provisionally *C. moluccensis* var. *ovalifolia* by Koorders and Valeton. Our material of this last variety is not, however, sufficiently extensive for a definite decision to be arrived at; so far as it goes it indicates that the two varieties, *gangetica* and *ovalifolia*, are not the same; in any case no characters have been given for var. *ovalifolia*. According to Schimper, whose very careful account of the Strand-flora, based chiefly on Malayan observations, has become classical, *C. moluccensis* in muddy places sends up blind root-suckers, like *Sonneratia*, *Avicennia*, etc.* This is not the writer's recollection with regard to the form usually accepted as typical *C. moluccensis*, so far as the Coco Group is concerned; the tree in question there affects rocky headlands only and does not accompany *C. obovata* into the swamp-forests: this was also the experience of Kurz as regards the tree in the Andamans.†

28. **Carapa obovata** Bl. *C. moluccensis* F. B. I. i. 567 partly, not of Lamk. *Xylocarpus Granatum* F. I. ii. 240. E. D. C 482.
Everywhere throughout the Sundribuns, on river-banks.
Vernac. *Dhundol; Gamur; Karam Bhola.*

A tree occasionally 40 feet high, usually smaller than the last species; leaves deciduous; bark light-brown, freely exfoliating in large broad flakes, light-red within; wood reddish-brown much resembling that of the preceding in qualities. The fruit is used in tanning; the roots have no root-suckers but form instead horizontal thicked sections that protrude through the mud (as in *Gengwa*) to act as respiratory organs.

Distrib.—S.-E. Asia on banks of muddy sea-creeks.

XIV.—OLACINEÆ.

26. Olax Linn.

29. **Olax scandens** Roxb.; F. I. i. 163; F. B. I. i. 575. E. D. O 127.
Northern forests, *Heinig*!
Vernac. *Koko Aru.*

A large woody climber; properties unimportant.
Distrib.—S.-E. Asia.

XV.—CELASTRINEÆ.

27. Salacia Linn.

30. **Salacia prinoides** DC.; F. B. I. i. 626. *Johnia coromandeliana* F. I. i. 169.

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* Schimper: *Die indo-malayische Strand-flora*, p. 99 (1891).
† Kurz: *Forest Flora of British Burma*, i, 226 (1877).

General, especially in the northern forests, but never common.
Vernac. *Chot-boroni; Modhu-phal; Dimal.*

A large climber or small straggling tree, 20 feet high; only used for fuel.
Distrib.—S.-E. Asia.

XVI.—RHAMNACEÆ.

28. **Zizyphus** Juss.

Leaves glabrous on upper side, woolly below . . *Jujuba.*
Leaves softly pubescent above, silky below . . *Œnoplia.*

31. ***Zizyphus Jujuba** Lamk.; F. I. i. 608; F. B. I. i. 632. E. D. Z 231.
Occasionally in clearings.
Vernac. *Bér.*

A small tree; often planted, here certainly so: fruit of very poor quality.
Distrib.—Tropics of Eastern Hemisphere and of Australia.

32. **Zizyphus Œnoplia** Mill.; F. I. i. 611; F. B. I. i. 634. E. D. Z 263.
Jatta, *Prain*!
Vernac. *Shiakol.*

A straggling shrub, useful as a hedge-plant; fruit eaten, but quality poor.
Distrib.—Tropical Asia and Australia.
Here the species is probably a remnant of cultivation near the old temple.

XVII.—AMPELIDEÆ.

29. **Vitis** Linn.

Leaves simple:—
  Stems 4-winged, fleshy . . . . *quadrangularis.*
  Stems not winged, not fleshy . . . *latifolia.*
Leaves 3-foliolate . . . . . . *trifolia.*

33. **Vitis quadrangularis** Wall.; F. B. I. i. 645. *Cissus quadrangularis* F. I. i. 407.
Satkhira, *Clarke*!
Vernac. *Harjora.*

A succulent almost leafless climber; properties insignificant.
Distrib.—Tropical E. Africa; S.-E. Asia.

34. **Vitis latifolia** Roxb.; F. I. i. 661; F. B. I. i. 652. E. D. V 213.
Jatta, *Prain*!
Vernac. *Govila.*

A large climber; stems may be twisted into ropes.
Distrib.—India generally; Assam.
A species almost certainly introduced by bird-agency.

35. **Vitis trifolia** Linn. *V. carnosa* F. B. I. i. 654. *Cissus carnosa* F. I. i. 409. E. D. V 195.

Everywhere common, from the northern clearings to the sea-face.

Vernac. *Goeli-lata ; Amal-lata.*

A slender climber; stems twisted into ropes.
DISTRIB.—S.-E. Asia.

30. Leea Linn.

36. **Leea sambucina** Willd.; F. I. i. 657; F. B. I. i. 666. E. D. L 241.

Eastern forests, *Heinig & Gammie* !

Vernac. *Kukur Jhiwa.*

A glabrous shrub; properties unimportant.
DISTRIB.—S.-E. Asia; N. Australia.

XVIII.—SAPINDACEÆ.

31. Cardiospermum Linn.

37. **Cardiospermum Halicacabum** Linn.; F. I. ii. 292; F. B. I. i. 670. E. D. C 551.

Northern clearings, rare, *Prain* !

A slender climbing herb; roots and seeds used medicinally.
DISTRIB.—Almost cosmopolitan in the Tropics.

32. Allophylus Linn.

38. **Allophylus Cobbe** Bl. VAR. **glabra** F. B. I. i. 672. *Ornithotrope glabra* F. I. ii. 267. E. D. A 787.

Sundribuns, *T. Thomson* !

A deciduous shrub; properties unimportant.
DISTRIB.—S.-E. Asia; N. Australia.

This has not been collected in the Sundribuns for half a century; it might be looked for. It is plentiful in the Andaman sea-fence.

33. Aphania Bl.

39. **Aphania Danura** Radlk. *Scytalia Danura* F. I. ii. 274. *Sapindus Danura* F. B. I. i. 684.

Eastern and northern forests, *Clarke* ! *Heinig* ! *Calcutta Garden Collectors* !

Vernac. *Badona ; Nuncha.*

An evergreen shrub; cut for firewood.
DISTRIB.—India; Indo-China.

XIX.—ANACARDIACEÆ.

34. Bouea Meissn.

40. **Bouea burmanica** Griff.; F. B. I. ii. 21. *Mangifera oppositifolia* F. I. i. 640. E. D. B 785.
Sundribun, "reserved forests," *fide Heinig.*
Vernac. *Miri-âm; Uri-âm.*

A timber tree 50 feet high, used for constructing parts of boats above the water-line; fruit edible.

Distrib.—Pegu; Tenasserim; Andamans; Java.

Of this species, which is given in Mr. Heinig's list, no specimens have ever been received in the Calcutta Herbarium from the Sundribuns. In response to an enquiry on the subject Mr. Heinig has kindly replied as follows:—"I regret that I have lost all recollection of *Bouea burmanica*, but I find the following among my notes of Sundribuns species:—*B. burmanica.* Occurrence doubtful. Probably introduced. Cultivated near villages for the sake of its fruit."

The species should, therefore, be again looked for. Mr. Heinig suggests that it would probably be found, if it occurs at all, on the mounds or raised platforms of higher grounds forming vestiges of the old salt-makers and dacoits, especially near the ruins not far from Cobaduk Revenue Station in Coupe No. 1 of the Khulna Working Circle, on the left bank of the Mandabari river.

35. Odina Roxb.

41. **Odina Wodier** Roxb.; F. I. ii. 293; F. B. I. ii. 29. E. D. O 38.
Northern clearings, self-sown or planted, *Calcutta Garden Collectors*! *Prain*! Mandabari ruins, *Heinig & Gammie*! Jatta ruins, *Prain*! Ambaria khal, at a small cleared camping-ground, *Prain*! Sea-face, *Heinig*!
Vernac. *Jiyal; Kamila-gâch.*

An ill-favoured deciduous tree, 40-50 feet high; wood hard but not durable; bark astringent.

Distrib.—India; Indo-China.

The sea-face locality is based on the presence at Calcutta of a specimen, in leaf only, sent by Mr. Heinig as Kamila-gâch. There does not seem to the writer to be much doubt as to the accuracy of his determination; the communication of an unusual vernacular name still, however, leaves some; having regard to this fact and to the further doubt whether *Odina* deserves to be considered other than a deliberately introduced species in the Sundribuns, complete botanical material of the tree known as Kamila-gâch is desirable.

CALYCIFLORÆ.

XX.—LEGUMINOSÆ.

36. Crotalaria, Linn.

Leaves simple:—
Flowers blue and white, in lateral as well as terminal racemes; leaves ovate . . . . . . *verrucosa*

Flowers yellow, in terminal racemes only; leaves oblanceolate-oblong . . . . *retusa.*

Leaves 3-foliolate; flowers yellow, mostly in long terminal racemes . . . . *Saltiana.*

42. **Crotalaria verrucosa** Linn.; F. B. I. ii. 77. *C. angulosa* F. I. iii. 273. E. D. C 2164.

Frequent in northern clearings, *Calcutta Garden Collectors*! *Prain*! also on the coast at Tiger Point, *Heinig*!

Vernac. *Ban Çan.*

A shrubby herb; properties unimportant.

DISTRIB.—Trop. Asia, Africa and America.

43. **Crotalaria retusa** Linn.; F. I. iii. 272; F. B. I. ii. 75. E. D. C 2155.

Coast, at Tiger Point, *Heinig*!

Vernac. *Chotka; Bhil Jhanjhan.*

A robust shrubby herb; yields a tolerable fibre.

DISTRIB.—Trop. Asia; introd. in Trop. Africa and America. Seeds almost certainly washed down by the rivers.

44. **Crotalaria Saltiana** Andr. *C. striata* F. B. I. ii. 84 partly. E. D. C 2159.

Sea-face, *Lace*! Northern clearings, *G. Thomson*! *Calcutta Garden Collectors*!

An erect shrubby herb; gives a fair fibre.

DISTRIB.—Trop. America and Africa; S.-E. Asia.

37. Cyamopsis DC.

45. ***Cyamopsis psoraloides** DC.; F. B. I. ii. 92. *Dolichos fabæformis* F. I. iii. 316. E. D. C 2514.

Sundribuns, cultivated, *Calcutta Garden Collectors*!

Vernac. *Guar.*

An annual crop; plants erect, stoutish, 2-3 feet high, with thick straight fleshy pods. Probably only occasionally cultivated in Sundribun clearings, as it has not been reported from these since 1845.

DISTRIB.—India generally, in the drier regions; and Afghanistan.

38. Sesbania Pers.

46. ***Sesbania grandiflora** Pers.; F. B. I. ii. 115. *Æschynomene grandiflora* F. I. iii. 331. E. D. S. 1186.

Planted at almost every clearing.

Vernac. *Bok-phul; Agati.*

A soft-wooded, quick-growing, short-lived tree, planted to support climbing vegetables; also leaves and flowers eaten.

DISTRIB.—Mascarenes to Malaya and N. Australia.

39. **Desmodium** Desv.

47. **Desmodium umbellatum** DC.; F. B. I. ii. 161. *Hedysarum arboreum* F. I. iii. 360.

Generally distributed, but nowhere plentiful.

A large shrub or small tree; used for firewood.

DISTRIB.—Mascarenes; coasts of S.-E. Asia; Polynesia.

40. **Abrus** Linn.

48. **Abrus precatorius** Linn.; F. I. iii. 258; F. B. I. ii. 175. E. D. A 51.

Jatta, *Prain*!

Vernac. *Kúnch.*

A climbing plant with slender stems; seeds used as goldsmiths' weights (*rati*), and as ornamental and rosary beads; root medicinal.

DISTRIB.—Cosmopolitan in the Tropics.

The species is more or less sacred, which may explain its occurrence beside the ruined temple at Jatta.

41. **Teramnus** Sw.

49. **Teramnus flexilis** Benth.; F. B. I. ii. 185.

Eastern Sundribuns, rare, *Clarke*!

A somewhat extensive climber; properties unimportant.

DISTRIB.—E. Himalaya; Assam; Chittagong.

This has only been found east of the Madumati, but may be expected to occur also on the western bank. From the distribution of the species it is possible that the seeds may have been brought down by the Brahmaputra or some of its tributaries.

42. **Mucuna** Adans.

50. **Mucuna gigantea** DC.; F. B. I. ii. 186. *Carpopogon giganteum* F. I. iii. 286.

Eastern Sundribuns, at Arpangassia Khal, Cheila Bogi River and elsewhere, *Kurz*! *Heinig*! *Gammie*! *Lace*!

A very extensive climber; stems twisted into ropes.

DISTRIB.—Coast forests of S.-E. Asia.

43. **Erythrina** Linn.

51. **Erythrina indica** Lamk.; F. I. iii. 249; F. B. I. ii. 188. E. D E 342.

Sea-face, *Heinig*!

Vernac. *Palita Mandar.*

A tall prickly tree, quick-growing, soft-wooded but the wood rather durable.

DISTRIB.—Coasts of S.-E. Asia and Polynesia: elsewhere planted.

44. Canavalia DC.

Pods not turgid, deeply double-channelled along dorsal suture *lineata.*

Pod turgid, almost flat along dorsal suture, endocarp separating *turgida.*

52. **Canavalia lineata** DC. *C. obtusifolia* F. B. I. ii. 196 (not of DC.) *Dolichos obcordatus* F. I. iii 303. E D. C 294.
Sea-face, *Heinig*!

A glabrous perennial; a good sand-binding species.
Distrib.—Cosmopolitan on tropical coasts.

53. **Canavalia turgida** Grah. *C. ensiformis* var. *turgida* F. B. I ii. 196. *Dolichos rotundifolius* F. I. iii. 302.
Common on river-banks in the central and northern forests.

A rather extensive climber, always near the sea.
Distrib.—Coasts of S.-E. Asia.

45. Phaseolus Linn.

Stipules attached by their bases; considerable climbers with entire leaflets and large white and purple flowers . *adenanthus.*
Stipules attached by their centres; small prostrate herbs with three-lobed leaflets and small yellow flowers . . . *trilobus.*

54. **Phaseolus adenanthus** Mey.; F. B. I. ii. 200. *P. alatus* F. I. iii. 288 (not of Linn.) E. D. P 484.
River-banks of northern forests and clearings.
Vernac. *Ban Barbati.*

A rather extensive climber; root tuberous, sometimes eaten.
Distrib.—Cosmopolitan in the Tropics.

55. **Phaseolus trilobus** Ait.; F. I. iii. 298; F. B. I. ii. 201. E. D. P 523.
Northern clearings, occasional. *Kurz*! *Clarke*! *Prain*!
Vernac. *Mugáni.*

A small wild pulse; a tolerable fodder.
Distrib.—Africa and Asia in tropical and subtropical regions.

46. Vigna Savi.

56. **Vigna luteola** Benth.; F. B. I. ii. 205. *Dolichos gangeticus* F. I. iii. 310.
General.
Vernac. *Ban Barbati.*

A trailing or climbing perennial; properties unimportant.
Distrib.—Cosmopolitan in the Tropics, near the coast.

47. Atylosia W. & A.

57. **Atylosia scarabæoides** Benth.; F. B. I. ii, 215. *Dolichos scarabæoides* F. I. iii. 315. E. D. R 347.
Jatta, *Prain*!
Vernac. *Banur Kalai.*

A slender biennial climber; eaten by cattle, otherwise valueless.
DISTRIB.—Mascarenes; S.-E. Asia.

48. Flemingia Roxb.

58. **Flemingia congesta** Roxb.; F. I. iii 340; F. B. I. ii. 228. E. D. F 633.
"Delta of the Ganges," *Meyne* (1796) *fide Roxburgh.*
Vernac. *Bara Salphan.*

An erect woody shrub; properties unimportant.
DISTRIB.—S.-E. Asia.

The *locus classicus* for this species is given by Roxburgh as the "Delta of the Ganges"—the term generally employed by him when speaking of the Sundribuns. The species has never been reported again from this area; it might, however, be looked for with a view to confirming Roxburgh's record.

49. Dalbergia Linn. f.

Branches spinescent; a usually erect shrub . . *spinosa.*
Branches unarmed; a considerable climber . . *torta.*

59. **Dalbergia spinosa** Roxb.; F. I. iii. 233; F. B. I. ii. 238. E. D. D 84.
General, on river-banks and near the sea-face.
Vernac. *Amanta.*

A thorny, sometimes climbing shrub; properties unimportant.
DISTRIB.—Coasts of Chittagong, Burma and Coromandel.

60. **Dalbergia torta** Grah. *D. monosperma* F. B. I. ii. 237. E. D. D 48.
General, especially plentiful in the eastern forests.
Vernac. *Panchioli.*

A scandent shrub; cut for firewood.
DISTRIB.—Coasts of S.-E. Asia; N. Australia; Polynesia.

50. Pongamia Vent.

61. **Pongamia glabra** Vent.; F. B. I. ii. 240. *Galedupa indica* F. I. iii. 239. E. D. P 1121.
General, on river-banks and in the forests, as far as the sea.
Vernac. *Pitajora; Koronja; Kerran; Dalkarancha.*

A tree, up to 50 feet high; wood white, turning yellow on exposure, hard, but liable to attack by insects; bark yields a gum; seed yields an oil (*Karanj-ka-tél*) used for burning and greatly used in native medicine for skin-diseases.

Distrib.—Mascarenes; coasts of S.-E. Asia; Polynesia; elsewhere often planted.

51. Derris Lour.

Vexillary stamen free; sutures of pod sinuate between the seeds *sinuata.*

Vexillary stamen more or less united with the others; pod not sinuate between the seeds:—

Pod narrow, pointed at both ends, several-seeded *scandens.*

Pod suborbicular, obtuse; seeds solitary . . *uliginosa*.

62. **Derris sinuata** Thw.; F. B. I. ii. 246!

Sea-face, at Tiger Point, *Heinig*!

Vernac. *Sundri-lata; Mahajani-lata.*

A large climber; stems twisted into ropes for tying logs.

Distrib.—India; Indo-China; Malaya: in coast forests.

63. **Derris scandens** Benth.; F. B. I. ii. 241. *Dalbergia scandens* F. I. iii. 232. E. D. D 330.

General.

Vernac. *Nioisha, Noa-lata.*

A large climber; properties unimportant.

Distrib.—S.-E. Asia; N. Australia: not confined to the coasts.

64. **Derris uliginosa** Benth.; F. B. I. ii. 241. *Galedupa uliginosa* F. I. iii. 243.

General.

Vernac. *Kelia-lata; Pan-lata.*

A large evergreen scandent shrub; stems twisted into ropes for tying logs.

Distrib.—E. Africa; Mascarenes; S.-E. Asia; Polynesia: on coasts and on muddy banks of tidal rivers.

52. Cæsalpinia Linn.

Pod covered with wiry prickles; petals narrow . *Bonducella.*

Pod smooth; petals broad . . . . . . *Nuga.*

65. **Cæsalpinia Bonducella** Flem.; F. I. iii. 357; F. B. I. ii. 254. E. D. C 6.

Sea-face; on skirts of forests; also in clearings for cultivation, *Calcutta Garden Collectors*! *Heinig*!

Vernac. *Nátá; Nátá Karanj.*

A large thorny climber; seeds, ground and mixed with pepper, are taken in cases of fever; also worn as necklaces.

Distrib.—Cosmopolitan in the Tropics.

66. **Cæsalpinia Nuga** Ait.; F. B. I. ii. 277. *C. paniculata* F. I. ii. 364. E. D. C 30.

Everywhere, from northern clearings to sea-face, common.

Vernac. *Nátua ; Nétu ; Shingri-lata.*

A prickly scandent shrub; properties unimportant.

DISTRIB.—Coasts of S.-E. Asia; N. Australia; Polynesia.

53. **Mezoneuron** Desf.

67. **Mezoneuron cucullatum** W. & A.; F. B. I. ii. 258. *Cæsalpinia cucullata* F. I. ii. 358.

"Delta of the Ganges," *Carey* (1796) *fide Roxburgh.*

A very extensive prickly climber, destructive to forest-growth.

DISTRIB.—S.-E. Asia; Malaya.

As in the case of *Flemingia congesta,* the *locus classicus* for this species is the "Delta of the Ganges." It has not been obtained again in the Sundribuns, but should be carefully looked for.

54. **Parkinsonia** Linn.

68. * **Parkinsonia aculeata** Linn.; F. B. I. ii. 260. E. D. P 322.

Planted in some of the northern clearings.

Vernac. *Belati Kikar.*

A hedge plant; yields fair fuel and makes good charcoal.

DISTRIB.—Native of Tropical America.

55. **Cassia** Linn.

Trees, with indehiscent, cylindric, woody pods; stamens 10 *Fistula.*
Herbs or shrubs, with dehiscent, compressed pods; stamens 7:—
  Leaves with a single large gland near base of common petiole; leaflets 6-12 pairs; a small shrub . . . *Sophera.*
  Leaves with two glands, one between each of the lower pairs of leaflets; leaflets 3 pairs; an annual herb . . *Tora.*

69. **Cassia Fistula** Linn.; F. I. iii. 333; F. B. I. ii. 261. E. D. C 756.

Jatta, among ruins, *Prain* ! also "Reserved Forests," *fide Heinig* in list.

Vernac. *Shongrál* (*Heinig*) ; *Amaltas.*

The "Indian Laburnum," a handsome tree, 50 feet high; wood red, hard, used for posts, rice-pounders and the like; bark used for dyeing and tanning.

DISTRIB.—S.-E. Asia: often planted.

Mr. Heinig includes this in his list but has not sent specimens. Replying to an enquiry regarding the tree, Heinig writes:—"As for *Cassia Fistula* I have got a note:—' An introduced, not an indigenous species.' So far as I recollect (although at this time, six years after my departure from the Sundribuns, I cannot feel sure) I found the species on those mounds or platforms of higher ground forming vestiges of the old salt-makers or dacoits, and would especially look for it near the ruins not far from the Cobaduk Revenue Station, in Coupe No. 1 of the Khulna Working Circle, on the left bank of the Mandabari river." The occurrence of the tree among the ruins round the Jatta temple is in keeping with Heinig's conclusion that it is only an introduced species in the Sundribuns.

70. **Cassia Sophera** Linn.; F. B. I. ii. 262. *Senna sophora* F. I. ii. 347. E. D. C 787.

Sea-face at Tiger Point, *Heinig*!

Vernac. *Kálanchi* (*Heinig*); *Kalkashonda.*

A shrubby weed; properties medicinal, cathartic.

DISTRIB.—Cosmopolitan in the Tropics, probably a native of Asia. Its occurrence at Tiger Point may be explained by its seeds having been brought down by one of the great rivers.

71. **Cassia Tora** Linn.; F. B. I. ii. 263, in part. *Senna Tora* F. I. ii. 340. E. D. C 797.

Northern clearings, *Calcutta Garden Collectors*! *Prain*!

Vernac. *Chakunda.*

A gregarious weed; yields a dye; properties also medicinal, cathartic.

DISTRIB.—Cosmopolitan in the Tropics.

56. **Cynometra** Linn.

72. **Cynometra mimosoides** Wall. *C. ramiflora* var. *mimosoides* F. B. I. ii. 267. E. D. C 2577.

Abundant throughout the central and eastern forests, *Calcutta Garden Collectors*! *Home*! *Heinig*! *Prain*! *Lace*!

Vernac. *Shingar; Shingra.*

A tree 20 feet high; wood hard, red, used in making carts, also for posts, and as fuel. Where this species occurs the seedlings of Sundri do not thrive, owing to its spreading and umbrageous habit.

DISTRIB.—Coasts of W. India; Ceylon; Burma; Andamans; Malaya.

57. **Tamarindus** Linn.

73. ***Tamarindus indica** Linn.; F. I. ii. 215; F. B. I. ii. 273. E. D. T 28.

Very occasionally planted in the northern clearings.

Vernac. *Tintuli; Imli.*

A large tree usually; in the Sundribun clearings small and not thriving; timber excellent but difficult to work; fruits acid and laxative; seeds yield an oil on expression.

DISTRIB.—Generally planted in the Tropics.

58. **Intsia** Thouars.

74. **Intsia bijuga** O. Kuntze. *Jonesia triandra* F. I. ii. 220. *Afzelia retusa* F. B. I. ii. 274.

General, but not plentiful in the central and eastern forests, *Heinig*! *Heinig & Gammie*! *Prain*!

Vernac. *Bhiála ; Bháila ; Bhádala ; Shundál ; Somdal ; Hinga ; Hingeh.*

A tree 30-40 feet high; wood reddish-brown, hard; used for beams, girders of bridges, house-posts, and fuel: the tree coppices freely.

DISTRIB.—Coast-forests of the Mascarenes; Indo-China; Malaya; Polynesia: not elsewhere in India.

59. **Entada** Adans.

75. **Entada Pursaetha** DC. *E. scandens* F. B. I. ii. 287. *Mimosa scandens* F. I. ii. 554. E.D. E 219.

Eastern forests.

Vernac. *Gila.*

A large climber; seeds roasted and eaten.

DISTRIB.—Cosmopolitan in the Tropics.

Though included in Heinig's list, specimens of this have not been sent from the Sundribuns: Heinig's record is, however, confirmed by the existence of an excellent coloured drawing of the plant in the Sundribun Forest office.

60. **Acacia** Linn.

Erect; branches armed with stipular spines:—
  Flowers yellow; pod thickened and sinuate between the seeds . . . *arabica.*
  Flowers purple; pod thin, flat and not sinuate . . *tomentosa.*
Climbing; branches without spines but armed with many recurved prickles:—
  Flowers yellowish; pod thick, succulent, somewhat depressed between the seeds . . . . *concinna.*
  Flowers whitish; pod thin, coriaceous and flat . *Intsia.*

76. ***Acacia arabica** Willd.; F. B. I. ii. 293. *Mimosa arabica* F. I. ii. 557. E. D. A 101.

Occasionally planted in the northern clearings, *Calcutta Garden Collectors*! *Clarke*! *Prain*!

Vernac. *Babul ; Kikar.*

A shrub or tree; wood good; yields an excellent gum; a good tan; and an indifferent dye.

DISTRIB.—Tropical Africa; India generally.

This is only planted in Sundribun clearings and thrives very indifferently.

77. **Acacia tomentosa** Willd.; F. B. I. ii. 294. *Mimosa tomentosa* F. I. ii. 558. E. D. A 299.

Northern forests, *Calcutta Garden Collectors* !

A small tree ; properties insignificant.

DISTRIB.—Western India and Ceylon ; here almost certainly planted : collected in 1856, not received from the Sundribuns since.

78. **Acacia concinna** DC. ; F. B. I. ii. 296. *Mimosa concinna* F. I. ii. 565. E. D. A 200.

Northern forests, *Calcutta Garden Collectors* !

Vernac. *Ban-ritha.*

A prickly scandent bush ; pods used as a substitute for soap ; also as a source of medicine.

DISTRIB.—S.-E. Asia : not collected in the Sundribuns since 1856.

79. **Acacia Intsia** Willd. ; F. B. I. ii. 297. *Mimosa Intsia* F. I. ii. 565. E. D. A 233.

Northern forests, *Calcutta Garden Collectors* !

A large prickly climber, destructive to forest-growth.

DISTRIB.—India generally : not collected in the Sundribuns since 1845.

XXI.—DROSERACEÆ.

61. Aldrovanda Linn.

80. **Aldrovanda vesiculosa** Linn. ; F. B. I. ii. 425. *A. verticillata* F. I. ii. 112.

Northern clearings, *Kurz* !

Vernac. *Malacca Jhangi.*

A floating aquatic, apparently very rare.

DISTRIB.—C. Europe ; Australia.

A species, with a peculiarly detached distribution, unless it occurs, but has been overlooked, in intermediate localities. Roxburgh, writing prior to 1814 (not published till 1832), does not say it is rare ; Voigt, writing in 1845, mentions his failure to find it near Calcutta. It was rediscovered by T. Thomson in 1855 in salt-pans south of Calcutta and just to the north of the Sundribun area, and again in 1867 by S. Kurz in salt-pans just within the northern boundary of our region.

XXII.—RHIZOPHOREÆ.

62. Rhizophora Linn.

Cymes longer than petioles, usually 3-flowered, from axils of leaves ; flowers pedicelled ; petals fleshy, woolly in front *mucronata.*

Cymes shorter than petioles, unusually 2-flowered, from axils of fallen leaves ; flowers sessile ; petals thin, glabrous . . *conjugata.*

81. **Rhizophora mucronata** Lamk. ; F. B. I. ii. 435. *R. Mangle* F. I. ii. 459. E. D. R 242.

Forests near the coast, and on banks of large rivers.
Vernac. *Khamo ; Bhára ; Bara Goran.*

A tree 25-35 feet high; wood red, hard, splits on seasoning, used only for fuel ; fruit said to be edible ; bark used in tanning.

Distrib.—Tropical shores of Eastern Hemisphere and Australia.

82. **Rhizophora conjugata** Linn. ; F. B. I. ii. 436.
Forests near and at the coast, *Heinig & Gammie* !
Vernac. *Khamo ; Bhára.*

A small tree or large shrub (*fide* F. B. I.); properties unimportant (*fide* E. D.).

Distrib.—Tropical shores of Eastern Hemisphere.

Our economic knowledge of the species of *Rhizophoreæ* is singularly incomplete. The present species is excluded from Heinig's list; Clarke correctly includes it as a Sundribun species. It should be noted in passing that Heinig & Gammie, as specimens named by the latter in Herb., Calcutta, show, took the species to be "R. mucronata," a circumstance that throws considerable doubt on the accuracy of the F. B. I. statement regarding the size of the tree, and on the justice of the E. D. conclusion as to its want of economic importance.

Both these points, and the further question as to its abundance or otherwise in the Sundribuns, require investigation by local officers.

63. Ceriops Arn.

83. **Ceriops Roxburghiana** Arn. ; F. B. I. ii. 436. E. D. C 972.
General, especially in the western forests, *Calcutta Garden Collectors* ! *T. Thomson* ! *Gamble* ! *Heinig* ! *Prain* ! *Lace* !
Vernac. *Gorán ; Guttia.*

A tree, 12-20 feet high ; wood brick-red, hard, used for house-posts and fire-wood ; makes excellent charcoal ; the bark affords a red dye and is used in tanning.

Distrib.—Tropical shores of the Eastern Hemisphere.

Our economic knowledge of the species of *Ceriops* is as inadequate as is that of the species of *Rhizophora.* Both Heinig and Clarke include *C. Candolleana*, as well as *C. Roxburghiana,* in their lists of Sundribun species ; on what authority it is difficult to say, since no collector has hitherto sent specimens of *C. Candolleana* to Herb., Calcutta. Heinig, indeed, speaks of *C. Candolleana* as the more important and plentiful of the two ; his own specimens, however, as well as those of Gamble distributed under the name *C. Candolleana,* prove on examination to be *C. Roxburghiana.* There is no obvious reasons why *C. Candolleana* should not occur, and under the circumstances it deserves to be carefully looked for; it may be distinguished from the very common *C. Roxburghiana* by its more pointed calyx-segments and its glabrous petals with 3-4 capitate bristles at their emarginate tips. The calyx-lobes of *C. Roxburghiana* are blunter ; its concave petals, though glabrous below, are setose-ciliate towards the apex.

64. Kandelia W. & A.

84. **Kandelia Rheedei** W. & A.; F. B. I. ii. 437. E. D. K 21.
General, in forests near coast and on banks of the larger rivers.

Vernac. *Goria.*

A tree 20 feet high; wood soft, used in charcoal-making; bark yields a dye.

DISTRIB.—Shores of S.-E. Asia.

65. **Bruguiera** Lamk.

Peduncles 1-flowered; calyx-teeth about 12, as long as the tube in the fruiting stage . . . . *gymnorhiza.*

Peduncles many-flowered; calyx-teeth about 8, much shorter than the tube in the fruiting stage . . . . . *parviflora.*

85. **Bruguiera gymnorhiza** Lamk; F. B. I. ii. 437. *Rhizophora gymnorhiza* F. I. ii. 460. E. D. B 898.

General, in forests near coast and on banks of the larger rivers.

Vernac. *Kankra.*

A tree 40 feet high; wood red-brown, hard, employed for beams, posts, planks, jhools and dabbas of boats, also as fuel; bark used for tanning.

DISTRIB.—Tropical shores of Eastern Hemisphere and Polynesia.

As will be seen in connection with the species that follows our economic knowledge of the *Bruguieras* is as imperfect as our knowledge of *Rhizophora* or *Ceriops.*

86. **Bruguiera parviflora** W. & A.; F. B. I. ii. 438. *Rhizophora parviflora* F. I. ii. 461.

"Delta of the Ganges," *Goodlad* (1796) *fide Roxburgh.*

A much smaller species than the true *Kankra;* qualities unrecorded, but probably similar to those of the other "Mangroves." Roxburgh's record of the occurrence of this tree in the Sundribuns is very precise, and though it has apparently never been met with in our area since it was obtained by Goodlad in 1796 it deserves to be looked for.

DISTRIB.—Shores of Indo-China and Malaya.

XXIII.—COMBRETACEÆ.

66. **Lumnitzera** Willd.

87. **Lumnitzera racemosa** Willd.; F. B. I. ii. 452. *Petaloma alternifolia* F. I. ii. 372. E. D. L 576.

General, at the sea-face and on river-banks.

Vernac. *Kirpa; Kripa.*

A tree, reaching 40 feet in height but usually much smaller; wood hard and durable, withstanding moisture, used for rafters and posts, and as fuel; makes a very good charcoal.

DISTRIB.—Shores of Indo-China; Malaya; N. Australia; Polynesia.

XXIV.—MYRTACEÆ.

67. **Eugenia** Linn.

88. **Eugenia fruticosa** Roxb.; F. I. ii. 487; F. B. I. ii. 499.

Forests, not common, *fide Heinig.*

Vernac. *Ban-jamb.*

A large shrub or small tree; cut for firewood.

DISTRIB.—Assam; Chittagong; Pegu; Tenasserim.

Heinig includes this in his list, but has not sent any specimens. The tree occurs in E. Bengal and there is no reason why it should not extend naturally into the northern forests. At the same time it may belong to the category in which *Bouea burmanica, Ægle Marmelos, Cassia Fistula, Diospyros Embryopteris* ought perhaps to be placed, and may indicate the remains of clearings that at one time existed but that have been re-invaded by forest.

68. **Psidium** Linn.

89. ***Psidium Guyava** Linn.; F. B. I. ii. 468. *P. pomiferum* F. I. ii. 480. *P. pyriferum* F. I. ii. 480. E. D. P 1343.

Northern clearings, planted.

Vernac. *Piyára.*

A small tree, cultivated for its fruit.

DISTRIB.—Native of America, now cosmopolitan in the Tropics.

69. **Barringtonia** Forst.

Calyx valvate; fruit ovoid, when ripe slightly 4-angled near the base *racemosa.*

Calyx somewhat imbricate; fruit oblong, fusiform, markedly 4-angled throughout . . . . *acutangula.*

90. **Barringtonia racemosa** Bl.; F. I. ii. 634; F. B. I. ii. 507. E. D. B 193.

Near river-banks, especially in the northern forests, *Calcutta Garden Collectors*! *Heinig*! *Prain*!

Vernac. *Kumia; Samandra.*

A tree, reaching 50 feet in height; wood white and soft, only used as fuel.

DISTRIB.—Shores of S.-E. Asia and Polynesia.

91. **Barringtonia acutangula** Gærtn.; F. I. ii. 635; F. B. I. ii. 508. E. D. B 180.

Northern clearings, *Calcutta Garden Collectors*! also on river-banks, associated with *B. racemosa, fide Heinig.*

Vernac. *Hidjal.*

A tree 20-30 feet high; wood hard, reddish, durable but apt to warp and not much used; affords an indifferent tan.

DISTRIB.—S.-E. Asia generally; N. Australia: not a coast species.

Mr. Heinig reports a third species of *Barringtonia*, B. speciosa! *Forst.*, as associated with *B. racemosa.* The species may be distinguished from the two preceding ones by its entire leaf-margins—in *B. racemosa* and *B. acutangula* the leaf-margins are crenate-denticulate, and by its much larger showy white flowers and very large quadrangular or nearly ovoid fruit. No specimens of

B. speciosa have, however, been sent to the Calcutta Herbarium, and its presence in these forests is therefore doubtful. There would be nothing to cause surprise in the existence of *B. speciosa* in the Sundribuns; it should, however, be recollected that in the Andamans and elsewhere the species seems confined to the beach-zone of the littoral forest. It may be looked for along the Sundribun 'sea-face, but its occurrence associated with *B. racemosa* on river-banks in the northern forests would be at least unusual. The species ought, however, to be carefully searched for.

XXV.—LYTHRACEÆ.

70. **Ammannia** Linn.

92. **Ammannia salicifolia** Monti; F. B. I. ii. 569.
Northern clearings, *Clarke*! *Heinig & Gammie*!
Vernac. *Dád Mari.*

A weed of wet places, properties unimportant.
DISTRIB.—India generally; Trop. Africa.

71. **Sonneratia** Linn. f.

Leaves narrow-oblong; calyx 4-lobed; petals 0; stigma very wide-umbellate . . . . *apetala.*
Leaves oblong or obovate-elliptic; calyx 6-lobed; petals 6; stigma capitate, not very large . . . . *acida.*

93. **Sonneratia apetala** Ham.; F. I. ii. 506; F. B. I. ii. 579. E. D. S 2369.
Banks of tidal rivers, most plentiful east of the Raimangal.
Vernac. *Keora.*

A gregarious tree, 50-60 feet high; wood reddish-brown, hard, used for indoor planks, furniture, boxes, jhools and dabbas of boats, also for fuel and charcoal. The roots send up vertical blind suckers.
DISTRIB.—Coast of W. India, and of Indo-China.

94. **Sonneratia acida** Linn. f.; F. I. ii. 506; F. B. I. ii. 579. E. D. S 2362.
Banks of rivers, principally in the northern forests.
Vernac. *Ora.*

A gregarious tree; wood soft, grey, only to use as fuel; the fruit is eaten and used as a fish-bait. The roots send up blind suckers.
DISTRIB.—Western India; Indo-China; Malaya: on coasts, and on banks of tidal rivers.

XXVI.—TURNERACEÆ.

72. **Turnera** Linn.

95. **Turnera ulmifolia** Linn.
Northern clearings, *Calcutta Garden Collectors*! *Heinig*!

A small under-shrub, escaped from gardens; has showy yellow flowers but is of no economic importance.

DISTRIB.—Native of America; generally naturalised throughout S.-E. Asia.

XXVII.—PASSIFLOREÆ.

73. Passiflora Linn.

96. **Passiflora suberosa** Linn.; F. B. I. ii. 599.

Northern clearings, *Calcutta Garden Collectors !*

A common herbaceous climber; properties unimportant.

DISTRIB.—Native of America: very plentiful everywhere, naturalised, in Lower Bengal. First reported from the Sundribuns in 1845.

XXVIII.—CUCURBITACEÆ.

74. Trichosanthes Linn.

Bracts of the male flowers small or none; leaves puberulous or pubescent beneath . . . . . *cucumerina.*

Bracts of the male flowers large and sheathing; leaves glabrous beneath . . . . *palmata.*

97. **Trichosanthes cucumerina** Linn.; F. I. iii. 702; F. B. I. ii. 609 E. D. F 576.

Northern clearings, cultivated and self-sown, *Calcutta Garden Collectors* !

Vernac. *Ban Chichinga.*

A large herbaceous climber; the bitter fruit is often eaten cooked.

DISTRIB.—S.-E. Asia; N. Australia.

98. **Trichosanthes palmata** Roxb.; F. I. ii. 704; F. B. I. ii. 606. E. D. T 600.

Jatta, among ruins, *Prain* !

Vernac. *Makál.*

A large herbaceous climber; fruit when pounded used as an external application in diseases of the ear.

DISTRIB.—S.-E. and E. Asia; N. Australia.

75. Luffa Cav.

99. **Luffa graveolens** Roxb.; F. I. iii. 716; F. B. I. ii. 614.

Jatta, among ruins, *Prain* !

A herbaceous climber; properties unimportant.

DISTRIB:—E. Himalaya; Tirhut and N. Bengal; Chittagong.

76. Momordica Linn.

100. **Momordica dioica** Roxb.; F. I. iii. 709; F. B. I. ii. 617. E. D. M 639.

Jatta, among ruins, *Prain* !

A herbaceous climber; fruit and tuberous root sometimes eaten.
DISTRIB.—S.-E. Asia.

77. Cucumis Linn.

101. **Cucumis trigonus** Roxb.; F. I. ii. 722; F. B. I. ii. 619. E. D. C 2298.

Northern clearings, not uncommon, *Calcutta Garden Collectors* ! *Prain* !

A herbaceous climber; root tuberous; properties unimportant.
DISTRIB.—Tropical and subtropical Asia.

Whether this is the wild plant from which the cultivated melon has been derived, or is a condition of the melon 'feral by reversion' is not absolutely clear, but, in the writer's opinion, the latter is the more probable explanation of its origin, so far at least as Bengal is concerned.

78. Cephalandra Schrad.

102. **Cephalandra indica** Naud.; F. B. I. ii. 621. *Momordica monadelpha* F. I. iii. 708. E. D. C 919.

Northern clearings, frequent, *Calcutta Garden Collectors* ! *Prain* !
Vernac. *Bhimbu*; *Tela Kucha.*

A herbaceous climber; fruit eaten cooked when green and fresh when ripe.
DISTRIB.—Tropical Africa; S.-E. Asia.

79. Zehneria Endl.

103. **Zehneria umbellata** Thw.; F. B. I. ii. 625. *Momordica umbellata* F. I. iii. 710. E. D. Z 182.

Northern forests, *Heinig* !
Vernac. *Kudari.*

A herbaceous climber; fruit sometimes eaten.
DISTRIB.—S.-E. Asia; N. Australia.

XXIX.—FICOIDEÆ.

80. Sesuvium Linn.

104. **Sesuvium Portulacastrum** Linn.; F. I. ii. 509; F. B. I. ii. 659. E. D. S 1203.

Locally plentiful on muddy banks, *Calcutta Garden Collectors* ! *Prain* ! Sea-face, plentiful, *Heinig* ! *Prain* !
Vernac. *Noona; Gangatora-ság.*

An extensively creeping plant; a tolerable mud-binding and an excellent sand-binding species.
DISTRIB.—Cosmopolitan on tropical shores.

81. Trianthema Linn.

105. **Trianthema monogyna** Linn.; F. B. I. ii. 660. *T. obcordata* F. I. ii. 445. E. D. T 537.

Northern clearings, occasional, *Calcutta Garden Collectors*! *Prain*!

A field-weed; properties unimportant.

Distrib.—Cosmopolitan in the Tropics.

COROLLIFLORÆ.

XXX.—RUBIACEÆ.

82. Oldenlandia Linn.

106. **Oldenlandia diffusa** Roxb.; F. I. i. 423; F. B. I. iii. 65.

Northern clearings, not uncommon, *Calcutta Garden Collectors*! *Prain*!

A diffuse weed; properties unimportant.

Distrib.—S.-E. and E. Asia.

83. Petunga DC.

107. **Petunga Roxburghii** DC.; F. B. I. iii. 120. *Randia racemosa* F. I. i. 525.

Northern and western forests, *Calcutta Garden Collectors*! *Home*! *Gamble*! *Heinig*! Eastern forests, *Lace*!

Vernac. *Pitanga; Jhijir; Narkheli; Ban Chár.*

A large shrub or small tree, 15 feet high; wood white, hard, used for making boxes and native furniture.

Distrib.—Indo-China; Malaya: in swamp-forests.

84. Vangueria Juss.

108. **Vangueria spinosa** Roxb.; F. I. i. 536; F. B. I. iii. 136. E. D. V 25.

Northern forests, exact locality not given, *Heinig*!

Vernac. *Moyena.*

A large thorny shrub; fruit eaten.

Distrib.—India; Indo-China; Malaya.

Possibly an originally introduced species, and one of the group to which *Diospyros Embryopteris*, *Cassia Fistula*, *Ægle Marmelos*, *Bouea burmanica*, etc., belong.

85. Ixora Linn.

Flowers white, small, in lax branching cymes . . *parviflora.*
Flowers red, larger, in condensed corymbose cymes . . . *coccinea* var. *Bandhuca.*

109. **Ixora parviflora** Vahl; F. I. i. 383; F. B. I. iii. 142. E. D. 1515.

Sea-face, *Heinig & Gammie*!

Vernac. *Rangan.*

An evergreen tree; wood light-brown, hard, close-grained; used for fuel.

Distrib.—India and Indo-China.

This species is common in the hotter and drier parts of India and Burma; its presence in the locality where Heinig and Gammie collected it (near Tiger Point) is most probably due to its seeds having been brought down by the great rivers from Upper India.

110. **Ixora coccinea** Linn. var. **Bandhuca**; F. B. I. iii. 145. *I. Bandhuca* F. I. i. 376. E. D. 1513.

Northern clearings, planted, *Heinig*!

Vernac. *Rangan.*

A shrub; used largely in native medicine for dysentery, which possibly explains its presence.

Distrib.—Indo-China, wild: widely cultivated in S.-E. Asia.

86. Morinda Linn.

111. **Morinda bracteata** Roxb.; F. I. i. 544. *M. citrifolia* var. *bracteata* F. B. I. iii. 156. E. D. M 656.

River-banks, and sea-face, *Calcutta Garden Collectors*! *Ellis*! *Heinig*! *Lace*!

Vernac. *Bara Chánd.*

A small tree; cut for firewood.

Distrib.—Tenasserim and Andamans in the coast-forests, plentiful: elsewhere planted. It extends as a wild shrub along the banks of the Hughli as far north as Calcutta.

XXXI.—COMPOSITÆ.

87. Vernonia Schreb.

112. **Vernonia cinerea** Less.; F. B. I. iii. 233. *Serratula cinerea* F. I. iii. 406. E. D. V 79.

Northern clearings, *Calcutta Garden Collectors*! Jatta, among ruins, *Prain*!

Vernac. *Kúk-shim; Kalajíra.*

A common weed; properties obscure.

Distrib.—Tropics of Eastern Hemisphere.

88. Ageratum Linn.

113. **Ageratum conyzoides** Linn.; F. B. I. iii. 243. *A. cordifolium* F. I iii. 415.

Northern clearings, at Chandpie only, *Heinig & Gammie*! but there plentiful, *Prain*!

Vernac. *Oochunti.*

A common weed; properties unimportant.

DISTRIB.—Cosmopolitan in the Tropics: originally American.

89. Grangea Forsk.

114. **Grangea maderaspatana** Poir.; F. B. I. iii. 247. *Artemisia maderaspatana* F. I. iii. 412. E. D. G 660.

Northern clearings, *Kurz*! *Heinig & Gammie*!

Vernac. *Namuti.*

A common weed; properties obscure.

DISTRIB.—Tropical and sub-tropical regions of the Eastern Hemisphere.

90. Conyza Less.

115. **Conyza semi-pinnatifida** Wall.; F. B. I. iii. 257.

Northern clearings, *Calcutta Garden Collectors*!

A common weed; properties unimportant. This has also been found by Mr. Clarke at Barisal in the Sundribun region east of the Madumati.

DISTRIB.—Assam, Burma; on the banks of large rivers.

91. Blumea DC.

116. **Blumea amplectens** DC.; F. B. I. iii. 260; VAR. **maritima.**

Northern clearings, *Kurz*! *Clarke*! *Heinig & Gammie*!

A spreading weed; properties unimportant.

DISTRIB.—India; Indo-China: always near the sea or on the coast.

92. Pluchea Cass.

117. **Pluchea indica** Less.; F. B. I. iii. 272. *Conyza corymbosa* F. I. iii. 426.

General, in open places.

Vernac. *Munjhú Rukha; Kukronda.*

A low shrub; properties unimportant.

DISTRIB.—S.-E. Asia: on coasts and in maritime swamps.

93. Sphæranthus Linn.

118. **Sphæranthus africanus** Linn.; F. B. I. iii. 275. *S. indicus* F. I. iii. 446 not of Linn.

Northern clearings, very common.

Vernac. *Khatta Palang.*

A coarse weed; properties unimportant.

Distrib.—Tropics of Eastern Hemisphere.

94. Xanthium Linn.

119. **Xanthium spinosum** Linn.

Banks of Mátla river, abundant, *Calcutta Garden Collectors*!

A spiny weed; properties obscure.

Distrib.—Native of S. Europe; recently introduced but now thoroughly established and abundant: so far, not recorded from any other part of India.

95. Wedelia Jacq.

Leaves 3-nerved; inner bracts of the involucre bluntish; a considerable climber . . . . . . *scandens.*

Leaves not 3-nerved; inner bracts of the involucre distinctly pointed; a prostrate or creeping herb . . . *calendulacea.*

120. **Wedelia scandens** Clarke. *W. biflora* F. B. I. iii. 306, not of DC. *Verbesina scandens* F. I. iii. 441.

River-banks and sea-face, climbing over bushes.

A considerable climber; properties unimportant.

Distrib.—S.-E. Asia; on coasts.

121. **Wedelia calendulacea** Less.; F. B. I. iii. 306. *Verbesina calendulacea* F. I. iii. 440. E. D. W 25.

Muddy banks; at Baniakhali, *Heinig*! Cheila, *Heinig & Gammie*! Ambaria Khal, *Prain*! Chandpie, *Prain*!

Vernac. *Kesaraj; Bhimraj.*

A weed of wet places; properties medicinal, used internally for coughs, externally as a stimulant for growth of hair and in skin diseases; an excellent mud-binding plant.

Distrib.—S.-E. and E. Asia.

96. Cnicus Linn.

122. **Cnicus arvensis** Hoffm.; F. B. I. iii. 362. *Carduus lanatus* F. I. iii. 408.

Northern clearings, general.

Vernac. *Shíal-kanta.*

A common weed; properties unimportant.
Distrib.— N. India; Himalaya; N. Asia; Europe.

97. Launea Cass.

123. **Launea pinnatifida** Cass.; F. B. I. iii. 417. *Prenanthes aspleniifolia* F. I. iii. 404 in part.

Sea-face, creeping on sand, *Calcutta Garden Collectors*!

A prostrate herb; an effective sand-binding species.
Distrib.—E. Africa; Mascarenes; S.-E. Asia: on sandy sea-shores.

XXXII.—PLUMBAGINEÆ.

98. Ægialitis R. Br.

124. **Ægialitis rotundifolia** Roxb.; F. I. ii. 111; F. B. I. iii. 479. E. D. A 5279.

South-western forests, abundant on edges of creeks, becoming less plentiful towards the east.

Vernac. *Sátári.*

A shrub or small tree; properties unimportant.
Distrib.—W. Indo-China; Malaya: in mangrove-swamps.

XXXIII.—MYRSINEÆ.

99. Ægiceras Gærtn.

125. **Ægiceras majus** Gærtn.; F. I. iii. 130; F. B. I. iii. 533. E. D. A 531.

River-banks and sea-face, very common.

Vernac. *Koilsha; Khalshi; Kulsi.*

A tree, reaching 20 feet in height; wood hard, only used as fuel.
Distrib.—Cosmopolitan on Tropical sea-shores.

XXXIV.—EBENACEÆ.

100. Diospyros Linn.

Leaves under 3 in. long, thin, herbaceous or papery, pubescent beneath; stamens 16; fruit glabrous *montana* var. *cordifolia.*
Leaves over 5 in. long, thick, coriaceous, glabrous; stamens 24 or more; fruit glandular or rusty-pubescent . . *Embryopteris.*

126. **Diospyros montana** Roxb.; F. B. I. iii. 555: VAR. **cordifolia.** *D. cordifolia* F. I. ii. 538. E. D. D 628.

Jatta, among ruins, *Prain*!

Vernac. *Ban Gáb.*

118

A small to medium tree; wood yellowish grey; soft but durable.

Distrib.—S.-E. Asia; N. Australia: here most probably a tree originally introduced. This is almost certainly specifically distinct from *D. montana*.

127. **Diospyros Embryopteris** Pers. F. B. I. iii. 556. *D. glutinosa* F. I. ii. 533. E. D D 582.

Mandabari ruins, *Heinig;* Jatta, among ruins, *Prain*! Eastern Forests, *Lace*! *Heinig*.

Vernac. *Gáb ; Makurkendi*.

An evergreen tree, reaching 60 feet in height. Wood white, hard; used for building, for masts and yards, and as fuel; the viscid pulp of the fruit is used to pay the seams of boats and to strengthen nets and cordage; it is full of tannin and is used in native medicine as an astringent; fruit also eaten.

Distrib.—S.-E. Asia.

As Heinig had not communicated specimens of this tree, which is stated in his list to be found in the reserved forests, but not to be common, and as the writer only met with it at Jatta it appeared possible that this might be only a survival, in *all* its localities, of abandoned settlements like that of Jatta. Consulted on the subject, Heinig has informed the writer that there are some fine Gáb trees (*Diospyros Embryopteris*) on the mounds or platforms of higher ground left by the old salt-makers or dacoits on the left bank of the Mandabari river. The properties of the Gáb, as will be seen, are just such as would lead to its having been planted by people of the class who once occupied these ruins. During a visit to the Sundribuns paid by Lace in January, 1903, it was, however, found that this *Diospyros* does occur in the swamp-forests in places where former settlement is not conceivable so that Heinig's record is already quite confirmed.

XXXV.—SALVADORACEÆ.

101. Azima Lamk.

128. **Azima tetracantha** Lamk.; F. B. I. iii. 620. E. D. A 1165.

Western river-banks and sea-face, *Calcutta Garden Collectors* !

Vernac. *Trikanta Gati*.

A thorny shrub; properties unimportant.

Distrib.—S. India; Mascarenes; S. Africa.

XXXVI.—APOCYNACEÆ.

102. Cerbera Linn.

129. **Cerbera Odollam** Gærtn.; F. I. i. 692; F. B. I. iii. 638.

River-banks everywhere, fairly common.

Vernac. *Dákur; Dábur; Dáko*.

A small tree, sometimes reaching 40 feet in height; wood white, soft, useless; seed yields an illuminating oil.

Distrib.—S.-E. Asia; Australia; Polynesia: in maritime swamps.

103. **Parsonsia** R. Br.

130. **Parsonsia spiralis** Wall.; F. B. I. iii. 650.
General, *Heinig* ! *Heinig & Gammie* ! *Prain* !

A large climber; properties unimportant.
DISTRIB.—S.-E. Asia.

XXXVII.—ASCLEPIADACEÆ.

104. **Hemidesmus** R. Br.

131. **Hemidesmus indicus** R. Br.; F. B. I. iv. 5. *Asclepias pseudosarsa* F. I. ii. 39. E. D. H 119.
Northern forests, *Heinig* ! Jatta, *Prain* !
Vernac. *Ananta-mal.*

A twining shrub; root medicinal.
DISTRIB.—India generally and Ceylon.

105. **Finlaysonia** Wall.

132. **Finlaysonia obovata** Wall.; F. B. I. iv. 7.
Everywhere, rather common.
Vernac. *Dudhi-lata.*

A lofty climber; stems twisted into ropes.
DISTRIB.—Shores of Indo-China and Malaya.

106. **Oxystelma** R. Br.

133. **Oxystelma esculentum** R. Br.; F. B. I. iv. 17. *Asclepias rosea* F. I. ii. 40. E. D. O 600.
Kagdip, *Calcutta Garden Collectors* !
Vernac. *Dudhia-lata.*

A slender glabrous twiner; properties obscure.
DISTRIB.—India; Indo-China; Malaya.

107. **Calotropis** R. Br.

134. **Calotropis gigantea** R. Br.; F. B. I. iv. 17. *Asclep iasgigantea* F. I. ii. 30. E. D. C 170.
Northern clearings, apparently very rare, only a few plants observed at Rampura, *Prain* ! Sea-face at Tiger Point, plentiful, *Lace* !
Vernac. *Akanda ; Gurtákand; Madár.*

An erect spreading shrub; yields a fibre used for fishing lines; also a dye; the sap affords an inferior " Gutta " and is medicinal.
DISTRIB.—S. E. Asia.

108. Pentatropis R. Br.

135. **Pentatropis microphylla** W. & A.; F. B. I. iv. 20. *Asclepias microphylla* F. I. ii. 35. E. D. P 396.

Skirts of northern clearings, climbing over bushes, *Calcutta Garden Collectors*! *Clarke*!

A small twiner; properties obscure.

Distrib.—India; Indo-China.

109. Dæmia R. Br.

136. **Dæmia extensa** R. Br.; F. B. I. iv. 20. *Asclepias echinata* F. I. ii. 44. E. D. D. 9.

Canning Town only, but there plentiful, on banks of Mátla river, *Calcutta Garden Collectors*! *Prain*!

Vernac. *Chhagal Bati.*

A fœtid weedy climber; yields a fair fibre; said to be medicinal.

Distrib.—India generally; Afghanistan.

This is one of the usual constituents of the "village shrubberies" characteristic of Lower Bengal; in India it accompanies man as a weed.

110. Sarcolobus Wall.

Corolla white with a purplish tinge, lobes pubescent within; fruit large, globose, greyish-brown, coriaceous, not winged . . *globosus*,

Corolla yellow with lines of brownish-purple dots, nearly glabrous within; fruit small, ellipsoid, yellow, chartaceous, with longitudinal wing-like ridges . . . . *carinatus*.

137. **Sarcolobus globosus** Wall. F. B. I. iv. 27.

Everywhere common, especially on river-banks, from the northern clearings to the sea.

Vernac. *Baoli-lata; Baoli-phal.*

A large climber; juice said by wood-cutters to be unwholesome.

Distrib.—Coasts of Indo-China and Malaya.

Heinig in his list states:—"The kernel of the ripe fruit is eaten." As the ripe fruit is filled with numerous subdiscoid seeds, there seemed to be here some mistake. Among Heinig's specimens is one of a plant termed "Baoli-phal," collected at Nalkora, regarding which he has noted "fruit eaten": unfortunately "Baoli-phal" has only leaves in a young condition, and the matter could not be satisfactorily settled. Recently, however, some Sundribun fishermen have brought fruiting specimens and have explained that they term the fruits "Baoli-phal" and eat the seeds, as well as the inside of the pericarp.

138. **Sarcolobus carinatus** Wall.; F. B. I. iv. 28.

Skirts of northern clearings and northern forests, common; not met with in the central or southern reserves.

Vernac. *Baoli-lati* (*fide Heinig*).

A small twiner; properties unimportant.
DISTRIB.—Coasts of W. Indo-China.

111. Dregea E. Mey.

139. **Dregea volubilis** Benth.; F. B. I. iv. 46. *Asclepias volubilis* F. I. ii. 36.
River-banks in Eastern forests, *Lace*!
Vernac. *Tita Kunja.*

A stoutish twiner; properties obscure.
DISTRIB.—Throughout India; Ceylon; Malaya.

112. Tylophora R. Br.

140. **Tylophora tenuis** Bl.; F. B. I. iv. 42. *Asclepias tenuissima* F. I. ii. 41.

Northern clearings and skirts of northern forests, very plentiful, *Kurz*! *Clarke*! *Prain*!

A slender prostrate or twining herb; properties obscure, said to be medicinal.
DISTRIB.—S.-E. Asia.

113. Dischidia R. Br.

141. **Dischidia Nummularia** R. Br.; F. B. I. iv. 49.
Bagirhat Reserve forests, epiphytic, *Heinig*!
Vernac. *Pargátcha.*

A small epiphytic twiner, rooting at the nodes; properties obscure.
DISTRIB.—Indo-China; Malaya; N. Australia.

114. Hoya R. Br.

142. **Hoya parasitica** Wall.; F. B. I. iv. 57. *Asclepias parasitica* F. I. ii. 42.
Everywhere throughout the forests, on trees; often very plentiful.
Vernac. *Pargátcha.*

A stout epiphytic climber; properties obscure; flowers waxy, sweet-scented.
DISTRIB.—Indo-China; Malaya.

XXXVIII.—GENTIANACEÆ.

115. Hoppea Willd.

143. **Hoppea dichotoma** Willd.; F. B. I. iv. 100. *Pladera pusilla* F. I. i. 403.

Northern clearings, locally abundant, *Heinig & Gammie*! *Calcutta Garden Collectors*! *Prain*!

A small herb; properties unimportant.

DISTRIB.—India generally; Assam; Chittagong.

116. Limnanthemum S. P. Gmel.

144. **Limnanthemum cristatum** Griseb.; F. B. I. iv. 131. *Menyanthes cristata* F. I. i. 459.

Northern clearings, occasional, *Prain*!

Vernac. *Pan-chuli; Chand Malla.*

A floating aquatic; properties obscure.

DISTRIB.—India; Indo-China; S. China.

XXXIX.—HYDROPHYLLACEÆ.

117. Hydrolea Linn.

145. **Hydrolea zeylanica** Vahl; F. B. I. iv. 133. *Nama zeylanica* F. I. ii. 73. E. D. H 504.

Northern clearings, *Heinig & Gammie*! *Calcutta Garden Collectors*!

Vernac. *Kasschra; Isha-langulia.*

A procumbent herb; properties obscure.

DISTRIB.—Cosmopolitan in the Tropics.

XL.—BORAGINEÆ.

118. Cordia Linn.

146. **Cordia Myxa** Linn.; F. I. i. 590; F. B. I. iv. 136. E. D. C 1931.

Chandpie, *Prain*!

Vernac. *Bohnari; Lashora.*

A medium tree; wood grey, only moderately hard, but durable and seasoning well, though liable to attacks by insects; fruit medicinal, mainly demulcent.

DISTRIB.—N. Africa; Tropical Asia; N. Australia; but often planted, as is the case in this instance.

119. Coldenia Linn.

147. **Coldenia procumbens** Linn.; F. I. i. 448; F. B. I. iv. 144. E. D. C 1717.

Sundribuns, *Clarke.*

A prostrate scabrous annual weed; properties obscure.

DISTRIB.—Cosmopolitan in the Tropics.

This species is included in Mr. Clarke's Sundribun list: there is no Sundribun specimen in the Calcutta Herbarium. It may be looked for in the Eastern

Sundribuns .(Backerganj District) and in the northern clearings. The plant has alternate crisped leaves and usually lies quite flat on the ground.

120. Heliotropium Linn.

148. **Heliotropium indicum** Linn.; F. I. i. 454; F. B. I. iv. 152 E. D. H 102.

Suta Khal, in clearing, not common, *Prain*!

An annual herb, mostly on waysides and in waste-places, rarely in fields; properties unimportant.

DISTRIB.—Cosmopolitan in the Tropics.

Mr. Clarke's list of Sundribun plants includes also *Heliotropium ovalifolium*. This species is not present from the Sundribuns in the Calcutta Herbarium; it should be looked for in the northern and eastern clearings.

XLI.—CONVOLVULACEÆ.

121. Stictocardia Hallier f.

149. **Stictocardia tiliæfolia** Hallier f. *Argyreia tiliæfolia* F. B. I. iv. 184. *Convolvulus gangeticus* F .I. i. 467.

Banks of tidal rivers in western parts, *Kurz*! *Calcutta Garden Collectors*! Sea-face, *Heinig*!

A twining or climbing shrub; properties unimportant.

DISTRIB.—S.-E. Asia.

122. Merremia Dennst.

150. **Merremia hederacea** Hallier f. *Ipomœa polyantha* F. B. I. iv. 206.

Eastern Sundribuns, *Clarke*!

A twining shrub; properties unimportant.

DISTRIB.—Malaya.

123. Ipomœa Linn.

Flowers large, white; leaves ovate-cordate entire; seeds shaggy with long hairs along the angles; climbing . . . *longiflora*.

Flowers purple or, if whitish or pale purple, with at least a dark purple eye:—

- Leaves palmately 5-7-lobed; seeds shaggy with long hairs along the angles; climbing . . . . *paniculata*.
- Leaves not palmately or digitately lobed:—
  - Leaves orbicular, obtuse or emarginate or 2-lobed; seeds villous, but not shaggy with long hairs along the angles; plant creeping in sand . . *Pes-capræ*.
  - Leaves acute or acuminate at the tip:—
    - Floating on water or rooting in mud at edges of ponds; leaves elliptic, oblong-cordate or hastate, sometimes

slightly lobed ; seeds finely silky but not shaggy along the margins . . . . . *reptans.*

Climbing over bushes or trees ; leaves ovate-cordate :—

Leaves entire ; a heavy creeper with large pink-purple flowers ; seeds shaggy with long hairs along the angles . . . . . *illustris.*

Leaves more or less lobed ; a light creeper with pale-purple or sometimes nearly white flowers but with always a dark-purple eye ; seeds furred but not shaggy along the angles, *sepiaria* var. *stipulacea.*

151. **Ipomœa longiflora** R. Br. *I. grandiflora* F. B. I. iv. 198.

Sea-face, *Heinig*!

A large climber ; properties unimportant.

DISTRIB.—Coasts of S.-E. Asia ; Australia ; New Caledonia ; Polynesia.

152. **Ipomœa paniculata** R. Br. *I. digitata* F. B. I. iv. 202. *Convulvulus paniculatus* F. I. i. 478. E. D. I 379.

Northern forests, *Prain!*

Vernac. *Bilai-kand* ; *Bhui-kumra.*

A large climber ; roots medicinal.

DISTRIB.—Cosmopolitan in the Tropics.

153. **Ipomœa Pes-capræ** Sweet. *I. biloba* F. B. I. iv. 212. *Convulvulus Pes-capræ* F. I. i. 485. E. D. I 362.

Sea-face, very common.

Vernac. *Chhagal-kuri.*

A prostrate herb ; an excellent sand-binding species.

DISTRIB.—Cosmopolitan in the Tropics.

154. **Ipomœa reptans** Poir. *I. aquatica* F. B. I. iv. 210. *Convulvulus repens* F. I. i. 432. E. D. I 343.

Northern clearings, occasional, *Calcutta Garden Collectors*!

Vernac. *Kalmi Sák.*

A floating aquatic ; used as a vegetable.

DISTRIB.—Tropics of Eastern Hemisphere and Australia.

155. **Ipomœa illustris** Prain. *I. campanulata* var. *illustris*, F. B. I. iv. 211.

Sea-face, *Heinig*! Cheila Bogi river, *Heinig & Gammie*! Pussar and Ambaria rivers, *Prain*! Eastern river-banks, *Lace*!

A large climber with handsome flowers ; properties unimportant.

DISTRIB.—W. Indo-China ; Malaya : on coasts.

156. **Ipomœa sepiaria** Kœn. VAR. **stipulacea** F. B. I. iv. 209. *Convulrulus stipulaceus* F. I. i. 484.

Very common on the skirts of the northern forests and in the northern clearings.

Vernac. *Ban Kalmi.*

A slender climber; properties unimportant.
DISTRIB.—Lower Bengal; Chittagong.

124. **Cuscuta** Linn.

157. **Cuscuta reflexa** Roxb.; F. I. i. 446; F. B. I. iv. 225. E. D. C 2508.

Northern clearings and skirts of northern forests, *Calcutta Garden Collectors*! In central forests only noticed in one place, *Prain*.

Vernac. *Alag-lata*.

A parasitic leafless twiner; whole plant used in native medicine.
DISTRIB.—S.-E. Asia.

XLII.—SOLANACEÆ.

125. **Solanum** Linn.

Flowers white, small; leaves green on both sides, glabrous; plants without prickles . . . . *nigrum*.

Flowers blue:—

Plants without prickles; leaves very white beneath *argenteum*.

Plants armed with prickles; leaves green:—

Spines long, straight; berry large, half an inch or more across; prostrate herbs . . . . *xanthocarpum*.

Spines short, recurved; berry rather small, one-third inch or less across; scandent under-shrubs . . *trilobatum*.

158. **Solanum nigrum** Linn.; F. B. I. iv. 229. *S. rubrum* F. I. i. 565. E. D. S 2299.

Northern clearings, rare, *Prain*!

Vernac. *Gurkhi*; *Gurkamai*.

A small under-shrub or herb; whole plant used in native medicine.
DISTRIB.—Cosmopolitan in temperate, sub-tropical and tropical regions.

159. **Solanum argenteum** Dun.

Abundant and thoroughly naturalized on banks of Mátla river, near Canning Town; *Calcutta Garden Collectors*! *Prain*!

A shrub, occasional in gardens; here wild and thoroughly established; properties obscure.
DISTRIB.—Native of S. America: here an escape.

160. **Solanum xanthocarpum** Schrad. & Wendl.; F. B. I. iv. 236. *S. diffusum* F. I. i. 568. *S. Jacquini* F. I. i. 569. E. D. S 2345.

Banks of Mátla river at Canning Town, *Prain*!

A diffuse very prickly herb; root and fruit reputed medicinal.
DISTRIB.—S.-E. Asia; Australia; Polynesia.

126

161. **Solanum trilobatum** Linn.; F. I. 571; F. B. I. i 236. E. D. s 2315.

General in the northern and western forests on river-banks and skirts of clearings.

A scandent under-shrub; root, leaves and fruit reputed medicinal.

DISTRIB.—S.-E. Asia: in or near tidal swamps.

XLIII.—SCROPHULARINEÆ.

126. Angelonia H. & B.

162. **Angelonia grandiflora** C. Morr.

Kagdip, rather common, *Prain*!

A "garden escape," though there are no gardens at Kagdip except that of the forest office, within which the species did not happen to occur. The same plant has been found by Kurz similarly established in places in the Irrawaddy Delta: the present is the first record of the species, other than as a garden plant, from Bengal.

DISTRIB.—Native of S. America.

127. Limnophila R. Br.

163. **Limnophila gratissma** Bl.; F. B. I. iv. 268.

Jatta, margin of the old temple tank, *Prain*!

An aquatic or marsh weed; properties unimportant.

DISTRIB.—S.-E. Asia.

128. Herpestis Gærtn. f.

164. **Herpestis Monnieria** H. B. K.; F. B. I. iv. 272. *Gratiola Monnieria* F. I. i. 141. E. D. H 149.

Northern clearings, general.

Vernac. *Adha Birni*.

A weed of marshy places; properties obscure.

DISTRIB.—Cosmopolitan in the Tropics.

129. Vandellia Linn.

165. **Vandellia crustacea** Benth.; F. B. I. iv. 279. *Torenia varians* F. I. iii. 96.

Northern clearings, occasional.

A weed of fields and waste places; properties unimportant.

DISTRIB.—Tropics of Eastern Hemisphere.

130. Scoparia Linn.

166. **Scoparia dulcis** Linn.; F. B. I. iv. 289.

Chandpie only, *Heinig & Gammie*! but there quite abundant, *Prain*!

An under-shrub; twigs used as tooth-brushes.
DISTRIB.—Native of America, now widespread in the Eastern Hemisphere and Australia.

XLIV.—LENTIBULARIACEÆ.

131. Utricularia Linn.

Peduncles with a whorl of oblong vesicles about the middle *stellaris*.
Peduncles naked or with a few obscure scales . *flexuosa*.

167. **Utricularia stellaris** Linn. f.; F. I. i. 143; F. B. I. iv. 328.
Ponds in northern clearings, rare.
Vernac. *Jhangi.*

A floating aquatic; properties unimportant.
DISTRIB.—Tropics of Eastern Hemisphere and N. Australia.

168. **Utricularia flexuosa** Vahl; F. B. I. iv. 329. *U. fasciculata* F. I. i. 143.
Ponds in northern clearings.
Vernac. *Jhangi.*

A floating aquatic; properties unimportant.
DISTRIB.—S.-E. Asia; N. Australia.

XLV.—BIGNONIACEÆ.

132. Dolichandrone Seem.

169. **Dolichandrone Rheedei** Seem.; F. B. I. iv. 379. E. D. D 753.
General, but never common, from the northern forests down to the coast, *Heinig*! *Prain*!
Vernac. *Gorshingiah.*

A tree, height 50 feet; wood white, soft, brittle; an indifferent fuel.
DISTRIB.—S.-E. Asia.

XLVI.—ACANTHACEÆ.

133. Hygrophila R. Br.

Unarmed herbs; calyx 5-toothed:—
Leaves lanceolate; capsule much longer than the calyx *quadrivalvis*.
Leaves obovate; capsule hardly longer than the calyx *phlomoides* var. *Roxburghii*.
Spinescent herbs; calyx 4-partite; leaves lanceolate . *spinosa*.

170. **Hygrophila quadrivalvis** Nees; F. B. I. iv. 408.
Chandpie, *Heinig & Gammie*!

A weed of marshy places; properties obscure.
DISTRIB.—India; Malaya; Indo-China.

171. **Hygrophila phlomoides** Nees VAR. **Roxburghii** F. B. I. iv. 408. *Ruellia obovata* F. I. iii. 51.

Common in the northern parts, *Hooker*! *Clarke*! *Kurz*! *Prain*!

A weed of marshy places; properties obscure.
DISTRIB.—Sub-Himalayan region; Bengal; Indo-China.

172. **Hygrophila spinosa** T. And.; F. B. I. iv. 408. *Ruellia longifolia* F. I. iii. 50. E. D. H 508.

Northern clearings, common.

Vernac. *Kanta Kalika; Kulia Khara.*

A spinous weed of wet places; properties obscure.
DISTRIB—India generally: Andamans, but there probably introduced.

134. Hemigraphis Nees.

173. **Hemigraphis hirta** T. And.; F. B. I. iv. 422. *Ruellia hirta* F. I. iii. 46.

Northern clearings, very rare, *Prain*!

A prostrate weed; properties unimportant.
DISTRIB.—Gangetic Plain generally.

135. Acanthus Linn.

Leaves spinous; bracteoles broad; corolla blue; stems erect . . . *ilicifolius*.
Leaves unarmed; bracteoles 0; corolla white with a yellowish tinge; climbing . . . . *volubilis*.

174. **Acanthus ilicifolius** Linn.; F. I. iii. 32; F. B. I. iv. 481. E. D. A 324.

Everywhere on river-banks and in low swampy places within the forests.

Vernac. *Hargoza; Kintki.*

An under-shrub; an excellent mud-binding species.
DISTRIB.—S.-E. Asia and N. Australia: on coasts.

Heinig reports from the western forests another species with spinous leaves, *A. ebracteatus*, but no specimens of this have reached the Calcutta Herbarium. It should be looked for; it differs from *A. ilicifolius* in having no bracteoles.

175. **Acanthus volubilis** Wall.; F. B. I. iv. 481.

River-banks in the western forests, very rare, *Wallich*! *Calcutta Garden Collectors*! *Heinig*!

A climbing under-shrub; properties unimportant.
DISTRIB.—Indo-China; Malaya: on coasts.

XLVII.—VERBENACEÆ.

136. Lantana Linn.

Leaves usually in whorls of 3, sometimes opposite; branches covered throughout with spreading hairs . . . *trifolia.*
Leaves usually opposite, sometimes in whorls of 3; branches scabrid with adpressed hairs . . . . . *indica.*

176. **Lantana trifolia** Linn.; F. B. I. iv. 563.
Eastern Sundribuns, at Barisal, *Clarke*!

A shrub, 3-8 feet high; a common weed on banks of rivers and creeks, of no economic importance. Though never yet recorded from the country between the Madumati and the Hughli, there is much likelihood that it occurs there; it ought to be searched for. Another reason for calling attention to the plant is the difficulty there is in distinguishing it from *Lantana indica*, and the further difficulty in distinguishing either of these *Lantanas* from *Lippia geminata.* The present is an American species, somewhat recently introduced to India.

177. **Lantana indica** Roxb.; F. I. iii 89; F. B. I. iv. 562.
Northern clearings, apparently very rare, *Calcutta Garden Collectors*!

A shrub 3-8 feet high; of no economic importance: exceedingly like the preceding species which is often only to be distinguished by its spreading pubescence. Though very common in Lower Bengal, outside the Sundribun area, it seems to have barely yet established itself in Sundribun clearings.

DISTRIB.—India generally; Beluchistan; Tropical Africa.

137. Lippia Linn.

Perennial, erect, softly strigose shrubs; leaves ovate-oblong, crenate; peduncles mostly opposite; bracts ovate-acuminate *geminata.*
Annual, creeping, minutely hairy herbs; leaves cuneate-spathulate, serrate; peduncles rarely opposite; bracts obovate-acute *nodiflora.*

178. **Lippia geminata** H. B. & K; F. B. I. iv. 563.
Northern clearings, rare, *Heinig*!

A shrub 3-8 feet high; of no economic importance: resembles *Lantana indica* even more closely than *Lantana trifolia* sometimes does, and when in flower often hardly distinguishable. When in fruit *Lippia geminata* is recognised by its fruit separating into two 1-seeded pyrenes; the fruits of the two *Lantanas* remain entire and contain the two 1-seeded pyrenes. In the Gangetic Plain north of the Sundribuns this is even more common than *Lantana indica*, but like that species has as yet hardly established itself in the Sundribun clearings.

DISTRIB.—E. Bengal: native of America.

179. **Lippia nodiflora** Rich.; F. B. I. iv. 563. E. D. I. 451.

Common in every clearing; occasional in suitable localities (upper margins of mud-banks) throughout the forests; also at the sea-face.

Vernac. *Bhui Okra.*

A prostrate herb; an excellent sand-binding and still more effective mud-binding species.

Distrib.—Cosmopolitan in tropical and sub-tropical regions.

138. **Premna** Linn.

180. **Premna integrifolia** Linn.; F. I. iii. 81; F. B. I. iv. 574. *P. serratifolia* F. I. iii. 77. *P. spinosa* F. I. iii. 77. E. D. P 1233.

River-banks, widely spread from the northern clearings to the sea, but not plentiful except at the sea-face, *Calcutta Garden Collectors*! *Gamble*! *Ellis*! *Prain*!

Vernac. *Goniári; Bhút Biravi.*

A shrub or small tree; wood white with reddish streaks, moderately hard; used as fuel.

Distrib.—Coasts of S.-E. Asia; E. Africa.

139. **Vitex** Linn.

Leaves 3-foliolate, and occasionally 1-foliolate; leaflets without petiolules, obovate and obtuse . . . . . *trifolia.*

Leaves 5-foliolate, and occasionally 3-foliolate; leaflets with distinct petiolules, lanceolate and acute . . . *Negundo.*

181. **Vitex trifolia** Linn. f.; F. I. iii. 69; F. B. I. iv. 583. E. D. V 181.

Sea-face to the east of the river Madumati.

Vernac. *Pani Sanbhalu.*

A small deciduous tree or large shrub; wood greyish-white, hard; used as fuel.

Distrib.—S.-E. Asia; N. Australia.

Though this has not yet been recorded from the central or western Sundribuns, it grows in similar situations to *V. Negundo* in a locality so adjacent that there is no reason why it should not occur. The species should, therefore, be looked for. It is exceedingly like, and might easily be casually mistaken for, *V. Negundo.*

182. **Vitex Negundo** Linn.; F. I. iii. 70; F. B. I. 583. E. D. V 164.

Sea-face at Tiger Point and elsewhere, plentiful, *Heinig*! *Prain*!

Vernac. *Sanbhalu; Nishinda.*

A deciduous small tree or large shrub; wood greyish-white, hard; used as fuel.

Distrib.—S.-E. Asia; Afghanistan.

140. **Clerodendron** Linn.

Corolla irregularly salver-shaped, never exceeding an inch in length; panicles axillary:—

Leaves obovate or elliptic, sub-obtuse, opposite or, very rarely in whorls of 3; calyx in fruit closely applied to the base of the berry . . . *inerme.*

Leaves elliptic, acute, or linear-oblong, generally in whorls of 3; calyx in fruit somewhat spreading, the fruit considerably larger . *neriifolium.*

Corolla narrowly funnel-shaped, never less than 3 inches in length; panicle terminal; leaves narrowly lanceolate . *Siphonanthus.*

183. **Clerodendron inerme** Gærtn.; F. I. iii. 58; F. B. I. iv. 589. E. D. C 1377.

Common on river-banks everywhere from the northern clearings to the sea, occasionally also in the forests.

Vernac. *Ban-jai; Ban-jám; Ban-jumet; Ban-modi; Butráj.*

An under-shrub; used as fuel.

Distrib.—India; Indo-China: on coasts.

184. **Clerodendron neriifolium** Wall.; F. B. I. iv. 589. *Volkameria neriifolia* F. I. iii. 64.

Sea-face, apparently very rare, *Heinig*!

An under-shrub; used as fuel.

Distrib.—Indo-China; Malaya; Philippines; Australia; China: on coasts.

185. **Clerodendron Siphonanthus** R. Br.; F. B. I. iv. 595. *Siphonanthus indica* F. I. iii. 67; E. D. C 1394.

Reserved forests, associated with *C. inerme, fide Heinig.*

Vernac. *Bámanhatti.*

A shrub, soft-wooded, useless.

Distrib.—S.-E. Asia: often planted.

This is given by Heinig in his list, but as no specimens of the plant have been sent, the record requires verification. It is possibly a plant of the same category as *Bouea, Cassia Fistula, Diospyros Embryopteris, Ægle,* etc.

141. Avicennia Linn.

Leaves obovate or elliptic obtuse, yellowish beneath; capsule broadly oblong obtuse . . . . *officinalis.*

Leaves lanceolate acute, white beneath; capsule narrowly conical, acute . . . . *alba.*

186. **Avicennia officinalis** Linn.; F. B. I. iv. 604. *A. tomentosa* F. I. iii. 88. E. D. A 1661.

Common everywhere from the northern borders to the sea-face.

Vernac. *Báen; Bani; Bina.*

A large timber-tree 40-60 feet high; wood dark-grey, hard, used for planking, beams, drain-pipes, sluices, oil-mills, jhools and dabbas of boats, and for fuel; exudes a gum applied to ulcers. The roots send up soft and pith-like blind root-suckers.

Distrib.—S.-E. Asia; N. Australia; Polynesia.

This is one of the tallest and is much the thickest of Sundribun species; the stems of old trees are very apt to become hollow. The structure of the wood is somewhat peculiar, in that the fibres of any particular ring of growth do not pass vertically upwards, but instead diverge "herring-bone fashion" from an indistinct vertical linear raphe, which appears to correspond to the plane of an original branch, at an angle of about 15°, their upper ends blending in a much less definite raphe midway between two raphes of divergence. The raphes of divergence of the ring of growth next above and next below any particular ring alternate, so that in weathered trunks and to a less extent in freshly cut sound logs, a lace-work arrangement of the fibres of the various rings of growth presents itself. This configuration and arrangement is to be observed also in the bark of the *Bakayan*, where it is more immediately patent, though perhaps less definite.

The wood-cutters speak of the existence of four distinct Báens: so far as could be gathered one of these is *Avicennia alba*, Dudhi Báen, with acute leaves and narrow sharp-pointed capsules, which is certainly a very distinct species. The other three have obtuse leaves and broad capsules and are all apparently forms of the present species. The three forms are (1) the tree, 40-60 feet high, with a girth of 12-15 feet, which has sometimes ovate-obtuse, sometimes oblong-obtuse leaves; (2) the shrub or small tree with broader ovate-obtuse leaves; (3) the shrub or small tree with narrower oblong-obtuse leaves. These three are, however, only distinguishable by the characters indicated and exhibit no botanically distinctive characters.

87. **Avicennia alba** Bl. *A. officinalis* var. *alba* F. B. I. iv. 604. E. D. A 1665.

River-banks, very rare; at Malanchi, *Lace & Prain!* Nalkhora, *Prain!*

Vernac. *Dudhi Báen.*

A small shrub; used as firewood.

Distrib.—Coasts of W. India; Indo-China; Malaya; N. Australia.

XLVIII.—LABIATÆ.

142. Ocimum Linn.

Pedicels of individual flowers as long as calyx . . *sanctum.*
Pedicels of individual flowers shorter than the calyx . *Basilicum.*

188. **Ocimum sanctum** Linn.; F. I. iii. 14; F. B. I. iv. 609. E. D. O 31.

Chandpie, *Heinig & Gammie!* Jatta, among ruins, *Prain!*

Vernac. *Túlsi.*

A herb or under-shrub; sacred.

Distrib.—Orient; S.-E. Asia: Australia; Polynesia.

189. **Ocimum Basilicum** Linn.; F. I. iii. 17; F. B. I. iv. 608. *O. pilosum* F. I. iii. 16. E. D. O 18.

Rampura, *Prain!*

Vernac. *Babui Túlsi.*

A herb or under-shrub: medicinal, and used as a flavouring in cookery.

Distrib.—Tropics of Eastern Hemisphere; Polynesia.

143. Anisomeles R. Br.

190. **Anisomeles ovata** R. Br.; F. B. I. iv. 672: VAR. **mollissima.** *Ajuga disticha* F. I. iii. 2. E. D. A 1136.

Jatta, among ruins, *Prain* !

Vernac. *Gobura.*

A coarse annual herb; properties obscure.

Distrib —S.-E. Asia.

144. Leucas R. Br.

191. **Leucas linifolia** Spreng.; F. B. I. iv. 690. *Phlomis zeylanica* F. I. iii. 9. E. D. L 323.

Northern clearings, common.

Vernac. *Hal-kúsa ; Guma.*

A herb; properties obscure.

Distrib.—Mauritius; S.-E. Asia.

INCOMPLETÆ.

XLIX.—AMARANTACEÆ.

145. Amarantus Linn.

Bracts awned, recurved, longer than the sepals; sepals 5; stamens 5 *paniculatus.*

Bracts acute but hardly awned, shorter than the sepals; sepals 3; stamens 3:—

Clusters of flowers both terminal and axillary; utricle with an acute tip . . . . *viridis.*

Clusters of flowers, all axillary; utricle blunt *polygamus.*

192. ***Amarantus paniculatus** Linn.; F. B. I. iv. 718. *A. frumentaceus* F. I. iii. 610. E. D. A 925.

Canning Town, *Calcutta Garden Collectors* !

A large herb, 4-5 feet high; cultivated as a pot-herb.

Distrib.—Trop. Africa and Asia.

193. **Amarantus viridis** Linn.; F. I. iii. 605; F. B I. iv. 720. E. D. A 953.

Kagdip, *Prain* !

Vernac. *Tún-túni Nati.*

A weed; used as a pot-herb.

Distrib.—Cosmopolitan in the Tropics.

194. ***Amarantus polygamus** Linn.; F. B. I. iv. 721. *A. polygonoides* F. I. iii. 602. E. D. A 941.

Canning Town, *Calcutta Garden Collectors* !

Vernac. *Champa Nati.*

A small cultivated pot-herb.
DISTRIB.—Cosmopolitan in the Tropics.

146. **Psilotrichum** Bl.

195. **Psilotrichum ferrugineum** Moq.; F. B. I. iv. 725. *Achyranthes ferruginea* F. I. i. 675.

Northern and western parts, in clearings and on mud-banks.

Vernac. *Rakto Sirinchi.*

A weed; of no economic importance.
DISTRIB.—Common in Lower Bengal.

147. **Alternanthera** Forsk.

196. **Alternanthera sessilis** R. Br.; F. B. I. iv. 731. *Achyranthes triandra* F. I. i. 678. E. D. A 877.

Northern and western parts, in clearings and on mud-banks.

A weed; of little importance except as a mud-binding species.
DISTRIB.—Cosmopolitan in the Tropics.

L.—CHENOPODIACEÆ.

148. **Salicornia** Linn.

197. **Salicornia brachiata** Roxb.; F. I. i. 84; F. B. I. v. 12. E. D. S 527.

Sundribuns, "on such low wet salt ground as is overflowed by the spring tides," *Roxburgh.*

A gregarious under-shrub; yields barilla; a good mud-binding species.
DISTRIB.—N. Ceylon; Coromandel Coast.

149. **Arthrocnemum** Moq.

198. **Arthrocnemum indicum** Moq.; F. B. I. v. 12. *Salicornia indica,* F. I. i. 85. E. D. A 1475.

Sundribuns, "grows with the former (*Salicornia brachiata*) and on similar ground," *Roxburgh.*

Vernac. *Jadu Palang.*

A gregarious prostrate undershrub; yields barilla; a mud-binding species.
DISTRIB.—Trop. Africa; coasts of India both west and east.

150. **Suæda** Forsk.

199. **Suæda maritima** Dumort.; F. B. I. v. 14. *Salsola indica* F. I. ii. 62. E. D. S 2990.

General, on muddy banks.

An erect herb; sometimes used as a vegetable.
DISTRIB.—Asia generally; Europe; N. Africa; N. America.

151. Basella Linn.

200. **Basella rubra** Linn, F. B. I. v. 20. *B. alba* F. I. ii. 104. E. D. B 203.

Clearings, cultivated; at Chandpie and Canning Town, also feral, *Prain*!

Vernac. *Poi Ság; Ban Poi.*

A much-branched twining herb: a favourite vegetable.
DISTRIB.—Tropical Africa and Asia.

The form seen in cultivation was in each case the very large form that is propagated by cuttings and not by seed; the feral state was the white-flowered Ban Poi, probably not truly wild, but only feral by reversion, in our area.

LI.—ARISTOLOCHIACEÆ.

152. Aristolochia Linn.

201. **Aristolochia indica** Linn.; F. I. iii. 489; F. B. I. v. 75. E. D. A 1398.

Sea-face at Tiger Point, prostrate on the sand, *Heinig*!

Vernac. *Isharmal.*

A prostrate or climbing under-shrub; used in native medicine; also (*Heinig*) a sand-binding plant.
DISTRIB.—Throughout India and in Chittagong.

LII.—LAURINEÆ.

153. Cassytha Linn.

202. **Cassytha filiformis** Linn.; F. I. ii. 314; F. B. I. v. 188. E. D. C 805.

Sea-face, parasitic, *Heinig*!

Vernac. *Akas-bél.*

A parasitic leafless twiner; reputed medicinal.
DISTRIB.—Cosmopolitan in the Tropics.

LIII.—LORANTHACEÆ.

154. Loranthus Linn.

Flowers with scale-like bracts but without bracteoles:—
  Leaves beneath covered with a rusty or whitish scurfy tomentum; corolla-tube 4-cleft . . . . . . *Scurrula.*
  Leaves beneath glabrous; corolla-tube shortly 5-fid *longiflorus.*

Flowers with both bracts and bracteoles, the latter connate in a cup; leaves glabrous, corolla tube 6-angled or rarely 5-angled below, and usually 6-partite, rarely 5-partite above . *globosus.*

203. **Loranthus Scurrula** Linn.; F. I. i. 550; ii. 186; F. B. I. v. 208; var. **bengalensis.**

General, especially on Gengwa (*Excœcaria Agallocha*).

Vernac. *Banda; Pargátcha.*

A leafy parasite; properties unimportant.

Distrib. (of this variety)—Assam; East Bengal.

204. **Loranthus longiflorus** Desr.; F. B. I. v. 214. *L. bicolor* F. I i. 548; ii. 185. E. D. L 549.

General, and on many species.

Vernac. *Bara Manda; Banda; Pargátcha.*

A leafy parasite; properties unimportant.

Distrib.—Throughout India.

205. **Loranthus globosus** Roxb.; F. I. i. 550; ii. 187; F. B. I. v. 220.

Occasional, and only seen on *Keora* (*Sonneratia apetala*).

Vernac. *Chhota Manda; Banda; Pargátcha.*

A leafy parasite; properties unimportant.

Distrib.—India generally; W. Indo-China; Malaya.

155. Viscum Linn.

206. **Viscum monoicum** Roxb.; F. I. iii. 763; F. B. I. v. 224. E. D. V 154.

Occasional; Bringoalni, *Heinig & Gammie*! Suta Khal, *Prain*!

Vernac. *Banda; Pargátcha.*

A leafy parasite; properties unimportant.

Distrib.—India; Indo-China.

LIV.—EUPHORBIACEÆ.

156. Euphorbia Linn.

Glands of the involucre with a distinct membranous, petaloid limb *hypericifolia* var. *indica.*

Glands of the involucre narrowly winged or wingless:—

Erect or ascending herbs; leaves distinctly nerved and copiously hispid with crisped hairs; leaves rarely less than three-quarters of an inch long . . . . . . *pilulifera.*

Prostrate herbs; leaves very indistinctly nerved and sparingly hispid; leaves never more than one-third of an inch long *thymifolia.*

207. **Euphorbia hypericifolia** Linn. var. **indica** F. B. I. v. 512. *E. uniflora* F. I. ii. 473. E. D. E 512.

Northern clearings, rare, *Prain*!

A weed; properties unimportant.
DISTRIB.—Tropical Asia and Africa.

208. **Euphorbia pilulifera** Linn.; F. B. I. v. 250. *E. hirta* F. I. ii. 472. E. D. E 531.
Northern clearings, *Calcutta Garden Collectors*!
Vernac. *Bara Kerui.*

A weed of waste places; properties unimportant.
DISTRIB.—Cosmopolitan in tropical and sub-tropical regions.

209. **Euphorbia thymifolia** Burm.; F. I ii. 473; F. B. I. v. 252. E. D. E 549.
Northern clearings, rare, *Prain*!
Vernac. *Çveta Kerui.*

A prostrate field-weed; properties strongly purgative.
DISTRIB.—Tropics everywhere, except in N. Australia.

157. **Bridelia** Willd.

210. **Bridelia stipularis** Bl.; F. B. I. v. 270. *B. scandens*, F. I. iii. 736. E. D. B 873.
Northern forests, *Calcutta Garden Collectors*!
Vernac. *Harinhárá.*

A large subscandent evergreen shrub; wood hard, brown, used as fuel.
DISTRIB.—Trop. Africa; S.-E. Asia.

158. **Agyneia** Vent.

211. **Agyneia bacciformis** A. Juss.; F. B. I. v. 285. *Phyllanthus bacciformis* F. I. iii. 661.
Clearings, and open muddy places in northern and western parts; common.

A sub-littoral herb or under-shrub; properties unimportant.
DISTRIB.—Mauritius; Coromandel Coast; Ceylon; Java.

159. **Phyllanthus** Linn.

212. **Phyllanthus Niruri** Linn; F. I. iii. 659; F. B. I. v. 298. E. D. P 657.
Northern clearings, very plentiful.
Vernac. *Bhui Amla.*

A field weed; properties medicinal—used externally for skin-affections, internally as a febrifuge.
DISTRIB.—Tropics everywhere, except in N. Australia.

160. Breynia Forst.

213. **Breynia rhamnoides** Muell-Arg.; F. B. I. v. 330. *Phyllanthus Vitis-Idæa* F. I. iii. 665. E. D. B 858.

Reserved forests, *Heinig*! Jatta, among ruins, *Prain*!

Vernac. *Kali Siki.*

A shrub or small tree; an unimportant weed.

DISTRIB.—S.-E. Asia.

161. Cyclostemon Bl.

214. **Cyclostemon assamicus** Hook. f.; F. B. I. v. 342.

Reserved forests, *Heinig*! *Heinig & Gammie*!

Vernac. *Ban Bokal.*

A tree, 30 feet high; wood brown, hard, used for planking.

DISTRIB.—Himalaya; Indo-China.

162. Antidesma Linn.

215. **Antidesma Ghaesembilla** Gærtn.; F. B. I. v. 357. *A. paniculatum* F. I. iii. 770. *A. pubescens* F. I. iii. 770. E. D. A 1219.

Jatta, among ruins, *Prain*!

Vernac. *Khúdi Jamb; Timtóa.*

A small tree; leaves and fruit eaten; wood used as fuel.

DISTRIB.—Tropics of the Eastern Hemisphere.

163. Croton Linn.

216. **Croton oblongifolius** Roxb.; F. I. iii. 685; F. B. I. v. 386. E. D. C 2180.

Northern forests, *Heinig*!

Vernac. *Chucka; Uri-ám* (*fide Heinig*).

A small deciduous tree; wood whitish-yellow, fairly hard and heavy but liable to crack, used as fuel; seeds yield a purgative oil.

DISTRIB.—India; Indo-China.

This tree is often used as a fence, whence possibly its occurrence in our area is to be explained.

164. Chrozophora Neck.

217. **Chrozophora plicata** A. Juss.; F. B. I. v. 409. *Croton plicatus* F. I. iii. 681. E. D. C 2211.

Northern clearings, *Prain*!

Vernac. *Khúdi Okra.*

An annual but sometimes shrubby weed; leaves yield a dye; seeds purgative; liber yields a fibre; whole plant used as fuel.

DISTRIB.—India; Orient; S. Europe; N. Africa.

165. Acalypha Linn.

218. **Acalypha indica** Linn.; F. I. iii. 675; F. B. I. v. 416. E. D. A 306.

Jatta, among ruins, *Prain*!
Vernac. *Khokli.*

An annual weed; whole plant medicinal—expectorant or emetic according to dose.

Distrib.—Tropics of Eastern Hemisphere.

166. Trewia Linn.

219. **Trewia nudiflora** Linn.; F. I. iii. 837; F. B. I. v. 423. E. D. F 525.

Sea-face, *Heinig*! Northern clearings, not planted.
Vernac. *Pitáli.*

A large tree; wood soft, not durable, used in making native drums; pulp of fruit sometimes eaten.

Distrib.—S.-E. Asia.

167. Mallotus Lour.

220. **Mallotus repandus** Muell-Arg.; F. B. I. v. 442. *Rottlera dicocca* F. I. iii. 829.

Northern parts, *Calcutta Garden Collectors*!
Vernac. *Nuna Bhanturi*; *Akús.*

An erect or climbing shrub; wood yellowish-white, hard, used as fuel.

Distrib.—S.-E. Asia; New Caledonia.

Heinig cites the first vernacular name here given as connoting *Croton caudatus*, which it apparently does in the Gangetic Plain. So far, however, specimens of *Croton caudatus* have not been sent from the Sundribuns to the Calcutta Herbarium, while the name is given by our collectors along with specimens of *Mallotus repandus.* The two plants are not unlike each other and the use of the same name for both is not surprising. *Croton caudatus* should be looked for.

168. Sapium P. Br.

221. **Sapium indicum** Willd.; F. I. iii. 692; F. B. I. v. 471. E. D. S 833.

General, *Roxburgh*, *T. Thomson*! *Clarke*! *Heinig*! *Prain*!
Vernac. *Batul.*

A tree, 20 feet high; wood light-brown, soft, used as fuel; seeds used by fishermen to poison water.

Distrib.—Southward to Tenasserim.

169. Excœcaria Linn.

222. **Excœcaria Agallocha** Linn.; F. I. iii. 756; F. B. I. v. 472 E. D. E 593.

Extremely plentiful everywhere, from the northern clearings to the sea-face.

Vernac. *Gengwa ; Geria ; Gheria ; Geo.*

A tree, 30-50 feet high ; wood white, soft, chiefly used as fuel, but also for making jhools, dabbas, posts, planks, native drums and toys : charcoal also is made from it and an oil is extracted. The juices of this tree, which is the commonest of all the Sundribun species, are poisonous.

Distrib.—Coasts of S.-E. Asia ; N. Australia ; and Polynesia.

The breathing organs developed in connection with the roots of *Gengwa* do not assume the form of vertical blind root-suckers like those of *Amoora, Avicennia, Sonneratia,* etc., but consist of horizontal thickened segments, richly furnished with lenticels, that protrude through the mud, exactly as in *Carapa obovata.*

LV.—URTICACEÆ.

170. Trema Lour.

223. **Trema orientalis** Bl.; F. B. I. v. 484. *Celtis orientalis* F. I. ii. 65. E. D. T 522.

Jatta, among ruins, *Prain* !

Vernac. *Chikun.*

A large tree-weed ; wood soft, used for making charcoal ; liber yields a tolerable fibre.

Distrib.—S.-E. Asia.

171. Streblus Lour.

224. **Streblus asper** Lour.; F. B. I. v. 489. *Trophis aspera* F. I. iii. 761. E. D. S 2912.

Northern forests, *Calcutta Garden Collectors* !

Vernac. *Shiora.*

A shrub or small tree ; wood white, moderately hard, close-grained, tough, elastic ; used to make cart-wheels, and gives a good fuel ; juice medicinal, and used instead of rennet ; the twigs are used in cleaning teeth ; the leaves are used to polish wood.

Distrib.—Everywhere throughout S.-E. Asia.

This is often used as a hedge-plant—a purpose which it serves admirably ; possibly its presence in our area is due to this fact.

172. Ficus Linn.

Petiole rigid, never more than half-an-inch long, usually shorter ;
aves ovate or rhomboid-elliptic . . *retusa* var. *nitida.*

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Petiole flexible, never less than an inch and a half long, usually longer :—
  Leaves 3-nerved at base; petiole not exceeding two inches long . . . . *infectoria.*
  Leaves 5-7-nerved at base; petiole two and a half inches long or longer :—
    Stipules large; petiole two and a half to three and a half inches long; leaf-blade with a cuspidate apex one-fifth the length of the blade proper . . . *Rumphii.*
    Stipules minute; petiole three to four inches long; leaf-blade with a caudate apex half the length of the blade proper *religiosa.*

225. **Ficus retusa** Linn. VAR. **nitida** King; F. B. I. v. 541. *F. Benjamina* F. I. iii. 550.

Reserved Forests, *Heinig*! *Lace*!

Vernac. *Jir; Zir.*

A tree, 50 feet high; wood worthless.

DISTRIB.—S.-E. Asia; N. Caledonia.

226. **Ficus infectoria** Roxb.; F. I. iii. 550; F. B. I. v. 515. E. D. F 216.

Jatta, among ruins, *Prain*!

Vernac. *Pakúr.*

A low deciduous tree; wood worthless.

DISTRIB.—S.-E. Asia. In India it is often planted, as it possibly originally was here.

227. **Ficus Rumphii** Bl.; F. B. I. v. 512. *F. cordifolia* F. I. iii. 548. E. D. F 265.

Sea-face, *Heinig*! Jatta, among ruins, *Prain*!

Vernac *Ausat; Gaiasvattha.*

A large tree; wood worthless.

DISTRIB.—S.-E. Asia.

228. **Ficus religiosa** Linn.; F. I. iii. 547; F. B. I. v 513.

Jatta, growing on an old pagoda, *Prain*!

Vernac. *Asvattha; Ausat.*

A large tree; wood worthless. A sacred species, whence possibly its presence here.

DISTRIB.—Bengal generally to the foot of the Himalaya; C. India: elsewhere planted.

LVI.—CASUARINEÆ.

173. Casuarina Forst.

229. **Casuarina equisetifolia** Forst.; F. B. I. v. 599. *C. muricata* F. I. iii. 519.

Banks of Jeodhara Khal, self-sown, *Lace*! *Prain*!
Vernac. *Bilati Jau.*

A tall handsome tree; wood brown, very hard and durable, but apt to crack; makes excellent fuel.

DISTRIB.—Shores of Indo-China; Malaya; Australia; Polynesia.

The presence of this species within our area as a wild tree, far from any planted examples, was first noticed by Mr. Lace. Probably the seeds which have given origin to these trees along the Jeodhara Khal, have been brought down by the stream from Morellganj, where an avenue of *Casuarinas* exists that was planted about 100 years ago.

LVII.—CERATOPHYLLEÆ.

174. Ceratophyllum Linn.

230. **Ceratophyllum demersum** Linn.; F. B. I. v. 639. *C. verticillatum* F. I. iii. 624.
Ponds and jhils in northern clearings.
Vernac. *Jhangi.*

A submerged aquatic; properties unimportant.

DISTRIB.—Cosmopolitan in the Tropics.

MONOCOTYLEDONES.

LVIII.—HYDROCHARIDEÆ.

175. Hydrilla Rich.

231. **Hydrilla verticillata** Casp.; F. B. I. v. 659. *Serpicula verticillata* F. I. iii. 578. *Vallisneria verticillata* F. I. iii. 751.
Ponds and jhils in northern clearings.
Vernac. *Jhangi; Kuréli.*

An aquatic weed; properties unimportant.

DISTRIB.—Tropical and sub-tropical regions of the Eastern Hemisphere and Australia.

176. Lagarosiphon Harv.

232. **Lagarosiphon Roxburghii** Benth.; F. B. I. iii. 659. *Vallisneria alternifolia* F. I. iii. 750.
Ponds and jhils in northern clearings.
Vernac. *Rasna-jhangi.*

An aquatic weed; properties unimportant.

DISTRIB.—S.-E. Asia.

177. Vallisneria Linn.

233. **Vallisneria spiralis** Linn.; F. B. I. iii. 660. *V. spiraloides* F. I. iii. 750. E. D. V 14.
Ponds and jhils in northern clearings.

Vernac. *Syála.*

An aquatic weed; properties unimportant.

Distrib.—Cosmopolitan in tropical and sub-tropical regions.

178. Ottelia Linn.

234. **Ottelia alismoides** Pers.; F. B. I. v. 662. *Damasonium indicum* F. I. ii. 216.

Ponds in northern clearings, rare, *Heinig*!

Vernac. *Parmi Kalla.*

An aquatic weed; properties unimportant.

Distrib.—S.-E. Asia; N. Australia.

LIX.—ORCHIDACEÆ.

179. Oberonia Lindl.

235. **Oberonia Gammiei** King & Pantling.

Eastern forests, *Heinig & Gammie*! *Prain*! *Lace*!

An epiphytic orchid; properties insignificant.

180. Dendrobium Sw.

Leaves equitant, fleshy, distichous; flowers small . . *anceps.*
Leaves not equitant, subcoriaceous; flowers showy . *Pierardi.*

236. **Dendrobium anceps** Sw.; F. I. iii. 487; F. B. I. v. 724.

Reserved Forests, *Roxburgh*, *Heinig & Gammie*! *Lace*!

An epiphytic orchid; of no economic value.

Distrib.—E. Himalaya; Assam; Tenasserim.

237. **Dendrobium Pierardi** Roxb.; F. I. iii. 482; F. B. I. v. 738.

"Delta of the Ganges," *Roxburgh.*

A showy epiphytic orchid.

Distrib.—E Himalaya; Chittagong; Tenasserim.

For this species the *locus classicus* is the Sundribuns, though it has not been collected there since Roxburgh's day; it should be looked for.

181. Cirrhopetalum Lindl.

238. **Cirrhopetalum Roxburghii** Lindl.; F. B. I. v. 774. *Ærides radiatum* F. I. iii. 476.

Eastern forests, *Carey, fide Roxburgh*; *Prain*! *Lace*!

An epiphytic orchid with small but handsome flowers.

182. Trias Lindl.

239. **Trias oblonga** Lindl.; F. B. I. v. 780.

Eastern forests, *Heinig & Gammie*! *Prain*! *Lace*!

An epiphytic orchid; of no economic importance.
DISTRIB.—Chittagong; Tenasserim.

183. **Luisia** Gaud.

Stems rather stout; sepals and petals pale yellowish-green; epichile of lip rhomboid, subtruncate, hypochile saccate *teretifolia.*
Stems very slender; sepals green outside, rose-purple inside, petals rose-purple with green base and tip; epichile of lip wide-ovate, hypochile almost flat . . . . . *brachystachys.*

240. **Luisia teretifolia** Gaud.; F. B. I. vi. 22. *Cymbidium triste* F. I. iii. 46.

General, but not plentiful, *Egerton, fide Roxburgh* (1809); *Heinig & Gammie; Prain*!

Vernac. *Pargátcha.*

An epiphytic orchid; of no economic value.
DISTRIB.—S.-E. Asia; Melanesia.

241. **Luisia brachystachys** Bl.; F. B. I. vi. 23.

Everywhere in the eastern and central forests, very common, *Heinig*! *Heinig & Gammie*! *Prain*! *Lace*!

Vernac. *Pargátcha.*

An epiphytic orchid; of no economic value.
DISTRIB.—Himalaya; Assam; Tenasserim.

184. **Saccolabium** Bl.

Peduncle slender, long, laxly paniculately branched; lip with a long cylindric spur . . . . *ochraceum.*
Peduncle stout, short; lip with a short conical spur:—
  Peduncles shortly corymbosely branched . *longifolium.*
  Peduncles simple, flowers in umbel-like corymbs *papillosum.*

242. **Saccolabium ochraceum** Lindl.; F. B. I. vi. 62.

Eastern forests, rather common, *Heinig*! *Heinig & Gammie*! *Prain*! *Lace*!

Vernac. *Pargátcha.*

An epiphytic orchid; properties unimportant.
DISTRIB.—S. India; Ceylon; E. Himalaya; Khasia; Tenasserim.

243. **Saccolabium longifolium** Hook. f.; F. B. I. vi. 62.

Eastern forests, at Supoti, *Heinig*!

Vernac. *Pargátcha.*

An epiphytic orchid; properties unimportant.
DISTRIB.—E. Himalaya; Assam; Tenasserim.

244. **Saccolabium papillosum** Lindl; F. B. I. vi 63. E. D. A 317.

Reserved forests, not uncommon, *Calcutta Garden Collectors*! *Heinig*! *Lace*!

Vernac. *Pargátcha*; ? *Rasna*.

An epiphytic orchid; properties unimportant.

DISTRIB.—Circars; E. Himalaya; Assam; Tenasserim.

185. **Sarcanthus** Lindl.

Leaves elongate, filiform; flowers in longish racemes	*appendiculatus*.
Leaves oblong, short, amplexicaul; flowers in short spikes	*insectifer*.

245. **Sarcanthus appendiculatus** Hook. f.; F. B. I. vi. 67.

Forests near sea-face, *Prain*! Eastern Forests, *Lace*!

Vernac. *Pargátcha*.

An epiphytic orchid; properties unimportant.

DISTRIB.—Tenasserim: E. Himalaya.

246. **Sarcanthus insectifer** Reichb. f.; F. B. I. vi. 68.

Reserved forests, everywhere, very common, *Heinig*! *Heinig & Gammie*! *Prain*! *Lace*!

Vernac. *Pargátcha*.

An epiphytic orchid; of no economic value.

DISTRIB.—Bengal; Behar; Cachar; Tenasserim.

This species is exceedingly plentiful throughout the Sundribuns and is the commonest orchid in these forests; the next most common is *Luisia brachystachys*, which is almost as plentiful. The third place, but a long way behind the other two, is taken by *Saccolabium ochraceum*. All the other species may be looked on as rare or uncommon.

186. **Cleisostoma** Hook. f.

247. **Cleisostoma ramosum** Hook. f.; F. B. I. vi. 72.

Occasional in the reserved forests; *Wallich! Clarke! Heinig & Gammie*!

Vernac. *Pargátcha*.

An epiphytic orchid; of no economic value.

DISTRIB.—E. Himalaya; Tenasserim.

LX.—SCITAMINEÆ.

187. **Zingiber** Adans.

248. **Zingiber Casumunar** Roxb.; F. I. i. 49; F. B. I. vi. 248. E. D. Z 199.

Jatta, among ruins, *Prain*!

Vernac. *Ban Ádá*.

A herb with perennial rootstock; properties aromatic and stimulant.

DISTRIB.—Tropical Asia, usually cultivated: no doubt here the species was originally introduced.

188. Alpinia Linn.

249. **Alpinia Allughas** Roscoe; F. I. i. 61; F. B. I. vi. 253. E. D. A 849.

Northern river-banks, Dacopie, *Heinig* !

Vernac. *Hasi; Taruko.*

A large herb with perennial rootstock; properties aromatic.

DISTRIB.—India; Indo-China.

LXI.—AMARYLLIDACEÆ.

189. Crinum Linn.

250. **Crinum asiaticum** Linn.; F. B. I. vi. 280. *C. toxicarium* F. I. ii. 134. E. D. C 2062.

Plentiful on river-banks in the northern and central forests, sometimes occurring also in the interior of the islands, *Heinig* ! *Prain* !

Vernac. *Káchori.*

A large succulent herb; properties emetic.

DISTRIB.—Coasts of Ceylon: common elsewhere in India, but cultivated.

LXII.—DIOSCOREACEÆ.

190. Dioscorea Linn.

251. **Dioscorea pentaphylla** Linn.; F. I. iii. 806; F. B. I. vi. 289. E. D. D 522.

Jatta, among ruins, *Prain* !

Vernac. *Kanta-álu.*

A large climber with bulbiferous stems; root-tubers sometimes eaten.

DISTRIB.—Tropics of Eastern Hemisphere.

LXIII.—LILIACEÆ.

191. Asphodelus Linn.

252. **Asphodelus tenuifolius** Cav.; F. B. I. vi. 332. *A. clavatus* F. I. ii. 148. E. D. A 1579.

"Sundribuns," *Calcutta Garden Collectors* (1845) !

An annual weed; occasional only in fields in Lower Bengal and then usually only when the crop with which it is associated is raised from seed imported from Upper India; it has not been reported from the Sundribun clearings since 1845. In Upper India the seeds are used medicinally.

DISTRIB.—Africa; Upper India.

LXIV.—COMMELINACEÆ.

192. Commelina Linn.

253. **Commelina benghalensis** Linn.; F. B. I. vi. 370. E. D. C 1748.
Jatta, among ruins, *Prain*!
Vernac. *Kánchará*.

A weed; leaves sometimes used as a vegetable.
DISTRIB.—Tropics of Eastern Hemisphere.

193. Aneilema R. Br.

254. **Aneilema nudiflorum** R. Br.; F. B. I. vi. 378. *Commelina nudiflora* F. I. i. 173.
Sea-face, growing in sand, *Heinig*!

A slender weed; of no economic importance.
DISTRIB.—S.-E. Asia.
The presence of this species on the coast is probably due to its seeds having been brought from the Upper Gangetic plain by the great rivers.

LXV.—FLAGELLARIÆ.

194. Flagellaria Linn.

255. **Flagellaria indica** Linn.; F. I. ii. 154; F. B. I. vi. 391.
Northern forests, and margins of clearings; also sea-face at Tiger Point, *Heinig*! *Calcutta Garden Collectors*! *Prain*!
Vernac. *Ah Beti; Kuh Bent; Banchanda*.

A lofty, slender, glabrous, cane-like climber; the stems are used to make native pens.
DISTRIB.—Tropics of the Eastern Hemisphere, near the coasts.

LXVI.—PALMEÆ.

195. Nipa Wurmb.

256. **Nipa fruticans** Wurmb.; F. I. iii. 650; F. B. I. vi. 424. E. D. N 163.
Everywhere on banks of estuaries and tidal rivers, and in swampy localities in interior of reserved forests.
Vernac. *Gólpatta*.

A soboliferous palm with a very large rootstock; an excellent protection for muddy banks. The large grooved leaf-stalks are used as floats for sundri-logs; the young leaves are twisted into rough ropes; the full-grown leaves are cut and exported for thatch. The young fruit is edible; toddy is obtained from the spathe.
DISTRIB.—Ceylon; Indo-China; Malaya; N. Australia: in mangrove-swamps.

196. Areca Linn.

257. ***Areca Catechu** Linn.; F. I. iii. 615; F. B. I. vi. 405. E. D. A 1294.

Eastern Sundribuns, Backerganj Dist., cultivated.

Vernac. *Supári.*

A tall graceful palm with slender stem; yields the Betel-nut.

Distrib.—Cultivated, usually near the sea, throughout S.-E. Asia.

197. Phœnix Linn.

258. **Phœnix paludosa** Roxb.; F. I. iii. 789; F. B. I. vi. 427. E. D. P 582.

Everywhere on or near banks of tidal rivers.

Vernac. *Hantál*; *Hiṭál.*

A gregarious palm, usually about 12 feet high, rarely higher; stems used for the framework of walls of native houses and for the dunnage of roofs; leaves used in thatching; fruit eaten; the roots send up short blind vertical root-suckers.

Distrib.—All Indo-Chinese coasts.

The height given for this species in the F. B. I. is up to 25 feet, but the tallest examples in the Calcutta Garden (and these are taller than any seen in the Sundribuns) do not reach 20 feet. The diameter is given in the F. B. I. as 12-18 inches; the largest stem, out of many hundreds measured, has not been found to exceed 2½ inches in diamater; local officers might make observations on these points.

Phœnix sylvestris *Linn.*, the Khajúr or wild date, is grown in the Bengal plain as a toddy palm just north of the Sundribun area, and possibly exists within the eastern Sundribuns (South Backerganj).

198. Calamus Linn.

259. **Calamus tenuis** Roxb.; F. I. iii. 780; F. B. I. vi. 447. E. D. C 114.

Northern forests, *Heinig*!

Vernac. *Sanchi Bent.*

A cane with long scandent stems; used for making the seats and backs of chairs, baskets, and the like.

Distrib.—Himalaya; Indo-China.

This is given in Heinig's list as *C. Rotang*; that species, however, is confined to S. India and Ceylon: Mr. Heinig's specimens are of *C. tenuis.*

199. Dæmonorops Bl.

260. **Dæmonorops Jenkinsianus** Mart.; F. B. I. vi. 462. E. D. C 99.

Northern forests, *T. Thomson*! *Heinig*!

Vernac. *Gola Bent.*

A stout scandent "rattan"; stems used for the same purposes as those of *Calamus tenuis.*

DISTRIB.—E. Himalaya; Assam; Chittagong.

This is given as *Calamus longipes* by Heinig, who mentions other "rattans" as associated with this and *C. tenuis.* No specimens of other species have been communicated, but, from Mr. Heinig's remark, it is probable that others do occur: they should be looked for.

200. Cocos Linn.

261. ***Cocos nucifera** Linn.; F. I. iii. 614; F. B. I. vi. 482. E. D. C 1520.

Eastern Sundribuns, S. Backerganj, cultivated.

Vernac. *Narikel.*

A tall unbranched palm; yields the coco-nut, also coir from the husk of the nut; the wood, known as Porcupine wood, is durable.

DISTRIB.—Cosmopolitan on tropical coasts.

Borassus flabellifer *Linn.*, the Tari Gách, a tall diœcious palm with fan-shaped leaves, is cultivated in the Bengal plain just north of the Sundribuns and may occur in the Eastern Sundribuns (S. Backerganj).

LXVII.—PANDANEÆ.

201. Pandanus Linn. f.

Carpels not united in groups; stamens free . . *fœtidus.*
Carpels united in groups; stamens connate . . *fascicularis.*

262. **Pandanus fœtidus** Roxb.; F. I. iii. 742; F. B. I. vi. 483.

Northern forests, *Heinig.*

Vernac. *Kotki Kánta.*

A shrubby screw-pine; properties insignificant.

DISTRIB.—Assam; Burma; Chittagong.

This is given in Heinig's list, but no specimens have been received; the record needs confirmation. This species is occasionally planted as a hedge and it may belong to the category of plants to which *Bouea, Cassia Fistula, Diospyros Embryopteris, Ægle, Cratæva,* etc., belong.

263. **Pandanus fascicularis** Lamk.; F. B. I. vi. 485. *P. odoratissimus* F. I. iii. 738. E. D. P 26.

Very general and often very abundant.

Vernac. *Kewa Kánta.*

A shrubby screw-pine, occasionally 10-15 feet high, usually much smaller. Leaves used for thatching; flowers eaten with pán; oil distilled and employed to mitigate the odour of castor oil.

DISTRIB.—India; Indo-China; Malaya; S. China; Polynesia.

LXVIII.—TYPHACEÆ.

202. Typha Linn.

Leaves usually more than an inch wide, trigonous above the sheath . *elephantina.*

Leaves usually less than an inch wide, semi-cylindric above the sheath *angustata.*

264. **Typha elephantina** Roxb.; F. I. iii. 566; F. B. I. vi. 489. E. D. T 864 partly.

Northern parts, on river-banks along the outskirts of the reserved forests.

Vernac. *Hogla.*

A large bulrush; leaves used in thatching; the split reeds are woven into mats for covering boats and for making walls and partitions of houses.

DISTRIB.—India; Indo-China; N. Africa.

265. **Typha angustata** Chaub. & Bory; F. B. I. vi. 489. *T. angustifolia* F. I. iii. 567. E. D. T 864 partly.

Northern parts, on banks of ponds and rivers.

Vernac. *Hogla.*

A large bulrush; used with and like the preceding.

DISTRIB.—S. Europe; N. Africa; N. Asia; India; Indo-China.

This is the commoner of the two bulrushes in Lower Bengal, to the north of the Sundribun area.

LXIX.—AROIDEÆ.

203. Cryptocoryne Fisch.

266. **Cryptocoryne ciliata** Fisch.; F. B. I. vi. 492. *Ambrosinia ciliata* F. I. iii 491.

Small creeks in northern clearings, on fringe of northern forests, very abundant. *Prain*!

A stoloniferous aquatic with linear-lanceolate leaves, growing in mud and submerged at high-tides; properties unimportant.

DISTRIB.—C. Bengal; Malaya.

204. Pistia Linn.

267. **Pistia Stratiotes** Linn.; F. I. iii. 131.; F. B. I. vi. 497. E. D. P 874.

Tanks and jhils, northern clearings, *Heinig*! *Prain*!

Vernac. *Táká-páná.*

A floating aquatic; an infusion of the leaves, also the soluble part of the ashes of the incinerated plant, used medicinally.

DISTRIB.—Cosmopolitan in the Tropics.

LXX.—NAIADACEÆ.

205. Ruppia Linn.

268. **Ruppia rostellata** Koch; F. B. I. vi. 568.

Northern parts, in ponds and jhils, very common.

Vernac. *Jhángi.*

A submerged aquatic; properties unimportant.
Distrib.—Europe; Temp. and Trop. Asia.

206. Naias Linn.

269. **Naias minor** All.; F. B. I. vi. 569. *N. dichotoma* F. I. iii. 749.
Pond at Jeodhara, *Prain*!
Vernac. *Jhángi.*

A submerged aquatic; properties unimportant.
Distrib.—General in the Eastern Hemisphere.

LXXXI.—CYPERACEÆ.

207. Kyllinga Rottb.

270. **Kyllinga triceps** Rottb.; F. I. i. 181; F. B. I. vi. 587.
Jatta, among ruins, *Prain*!
Vernac. *Nirbishi.*

A small sedge; properties unimportant.
Distrib.—Africa; S.-E. Asia; Australia.

208. Pycreus Beauv.

271. **Pycreus polystachyus** Beauv.; F. B. I. vi. 392. *Cyperus polystachyus* F. I. i 193.
In all the northern cleared or partially cleared spaces, plentiful; also at the sea-face among sand, *Heinig*! *Prain*!
Vernac. *Jangli Modhi.*

A small glabrous sedge; properties unimportant, except that it is a sand-binding species.
Distrib.—Cosmopolitan on or near tropical and sub-tropical sea-shores.

209. Cyperus Linn.

Fruit, a plano-convex nut, with a flat face next the rachilla; umbels compound; leaves and bracts long . . *inundatus.*
Fruit, an equilaterally trigonous nut:—
  Stoloniferous sedges:—
    Stolons long, hardening at length into woody rootstocks; leaves short or 0; stems stout:—
      Leaves very few, 2-3 in. (rarely as much as 6 in.) long; rachilla with a very narrow wing; glumes when dry with their margins crisply incurved all round *malaccensis.*
      Leaves hardly any; rachilla distinctly winged; glumes when dry with their margins recurved *tegetiformis.*
    Stolons short, slender, with very slender stems *scariosus.*

Stolons 0; leaves and bracts long; rachilla distinctly winged . . . *exaltatus* var. *dives*.

272. **Cyperus inundatus** Roxb.; F. I. i. 301. *Juncellus inundatus* F. B. I. vi. 595 E. D. C 2601.

River-banks, not uncommon.

Vernac. *Pati.*

273. **Cyperus malaccensis** Lamk.; F. B. I. vi. 608. *C. Pangorei* F. I. i. 202. E. D. C 2609.

Banks of Cheila Bogi river, *Heinig & Gammie*!

Vernac. *Chumati Pati.*

A large glabrous sedge; useful for binding and protecting muddy river-banks.

Distrib.—S.-E Asia; Australia; Polynesia.

A stout sedge; an excellent mud-binding species.

Distrib.—Silhet; E. Bengal; C. Bengal.

274. **Cyperus tegetiformis** Roxb.; F. B. I. vi. 612. *C. nudus* F. I. i. 209.

Sea-face at Tiger Point, *Heinig*!

Vernac. *Halaizu; Goola-methi.*

A large glabrous sedge; properties unimportant.

Distrib.—India; Indo-China; China; Japan.

This sedge is plentiful in swampy places in C. Bengal, but has not hitherto been reported from the coasts of India; doubtless its seeds have been washed down by the great rivers and cast up at Tiger Point.

275. **Cyperus scariosus** R. Br.; F. B. I. vi. 612. *C. pertenuis* F. I. i. 198. E. D. C 2617 partly only.

Northern settlements and partial clearings, plentiful, *Clarke*!

Vernac. *Nagar Modhi.*

Distrib.—Indo-China; Australia.

Very like the preceding species but more slender in all its parts; in India this plant is confined to the northern Sundribuns and the immediately adjacent portion of Lower Bengal.

276. **Cyperus exaltatus** Retz var. **dives** Clarke; F. B. I. vi. 617, C. *umbellatus* F. I. i. 205.

Northern clearings, in ponds and jhils, *Kurz*! *Calcutta Garden Collectors*! *Clarke*!

A tall sedge; used for making matting.

Distrib.—Northern India.

210. Mariscus Vahl.

277. **Mariscus albescens** Gaud.; F. B. I. vi. 623.

Chandpie, *Prain!* Sea-face, very abundant, *Heinig*! *Prain*!

Vernac. *Halaiya.*

A large greyish sedge; one of the most useful of sand-binding species.
DISTRIB.—Tropical shores from Africa to Polynesia.

211. Eleocharis R. Br.

278. **Eleocharis spiralis** R. Br.; F. B. I. vi. 627. *Scirpus spiralis* F. I. i. 212.

In shallow standing water, near coast, *Heinig*!

Vernac. *Halaiya.*

A slender pipe-sedge; properties unimportant.
DISTRIB.—India; Indo-China.

212. Fimbristylis Vahl.

Lower glumes of the spikelets in a continuous spiral:—
  Spikelets never more than half an inch long, usually considerably shorter:—
    Spikelets in an umbel of usually 5-10, sometimes up to 20, very rarely 3, 2 or 1; glumes puberulous *ferruginea.*
    Spikelets usually solitary, very rarely 2 or 3; glumes glabrous . . . *polytrichoides* var. *halophila.*
  Spikelets always three-quarters of an inch to an inch long, solitary or 2-3, rarely 4-6 . . . *sub-bispicata.*
Lower glumes of the spikelets distichously imbricate *monostachya.*

279. **Fimbristylis ferruginea** Vahl; F. B. I. vi. 638. *Scirpus globulosus* F. I. i. 227.

Very common, both in the northern clearings and at the sea-face.

A tufted sedge; sand-binding, otherwise with properties unimportant.
DISTRIB.—Cosmopolitan in tropical and sub-tropical countries.

280. **Fymbristylis polytrichoides** Vahl VAR. **halophila** Kurz; F. B. I. vi. 632.

Canning Town, *Kurz*! *Calcutta Garden Collectors*! Jatta, Chandpie, Jeodhara, etc., *Prain*!

A sub-littoral sedge, known only (this variety) from the Sundribuns and Madras.

281. **Fimbristylis sub-bispicata** Nees & Meyen; F. B. I. vi. 634.

Sundribun sea-face, *Heinig*!

A littoral sedge; sand-binding; known in India only from the Sundribun coast and from Orissa; common on the coasts of China and Japan.

282. **Fimbristylis monostachya** Hassk.; F. B. I. vi. 649. *Scirpus schœnoides* F. I. i., 221.

Jatta, *Prain*!

A small glabrous sedge, common in the Gangetic plain.
DISTRIB.—Cosmopolitan in the Tropics.

213. Scirpus Linn.

Spikelets very many, in large decompound corymbs with several very large flat divaricate leafy bracts . . . . *grossus.*

Spikelets few ; lowest bract alone manifest and resembling a continuation of the stem :—

Stems more or less 3-cornered at least in the upper portion and not transversely septate ; flowers with hypogynous bristles ; spikelets pedicelled :—

Hypogynous bristles plumose with spreading hairs *littoralis.*

Hypogynous bristles scabrid but not plumose *triqueter* var. *segregata.*

Stems terete throughout, transversely septate ; flowers without hypogynous bristles ; spikelets clustered in a dense lateral head . . . . . . *articulatus.*

283. **Scirpus grossus** Linn. f. ; F. I. i. 231 ; F. B. I. vi. 659.
Northern and eastern parts, in still water.
Vernac. *Kasúru.*

A large sedge ; properties unimportant.
DISTRIB.—S.-E. Asia.

284. **Scirpus littoralis** Schrad. ; F. B. I. vi. 659. *S. pectinatus* F. I. i. 218.
Northern parts, *Kurz* ! *Calcutta Garden Collectors* !

An aquatic sedge ; properties unimportant.
DISTRIB.—Europe ; Africa ; Orient ; India ; Australia.

285. **Scirpus triqueter** Linn. VAR. **segregata** Clarke ; F. B. I. vi. 658.
Northern clearings, *Clarke* !

A sedge of muddy places ; properties unimportant.
DISTRIB.—Northward into the Bengal Plain ; New Guinea.

286. **Scirpus articulatus** Linn. ; F. I. i. 214 ; F. B. I. vi. 656.
Northern parts, rare, *Heinig* !

An aquatic sedge of wet places ; properties unimportant.
DISTRIB.—Africa ; S.-E. Asia ; Australia.

214. Cladium P. Br.

287. **Cladium riparium** Benth. VAR. **crassa** Clarke ; F. B. I. vi. 675.
Eastern Sundribuns, plentiful, *Clarke* !

A very large sedge, about 6 feet high.
DISTRIB.—Ceylon.

This has only been obtained by Clarke and only to the east of the Madumati, but it is, where it occurs, abundant. It might be looked for in the area between the Hughli and the Madumati.

215. Scirpodendron Zipp.

288. **Scirpodendron costatum** Kurz ; F. B. I. vi. 684.

Reserved forests, south of Suta Khal, growing with *Pandanus* in the swampy interior, *Prain* !

A stout sedge with large woody nuts enclosed in a succulent, edible epicarp.
DISTRIB.—Ceylon ; Malaya ; Australia ; Samoa.

LXXII.—GRAMINEÆ.

216. Paspalum Linn.

Stems decumbent at base ; leaves rather broad ; spikelets orbicular *scrobiculatum.*
Stems creeping and rooting ; leaves narrow ; spikelets ovate-oblong *distichum.*

289. **Paspalum scrobiculatum** Linn. ; F. I. i. 278 ; F. B. I. vii. 10. *P. Kora* F. I. i. 279. E. D. P 332.

Jatta, *Prain* ! Canning Town, *Calcutta Garden Collectors* !
Vernac. *Kodo-dhan.*

A fodder grass.
DISTRIB.—Cosmopolitan in the Tropics.

290. **Paspalum distichum** Linn. ; F. B. I. vii. 12. *P. longiflorum* F. I. i. 279.

Sundribuns, *Hooker & Thomson* ! at Kabutar, plentiful, *Prain* !

An indifferent fodder-grass ; valuable as a mud and sand-binding plant.
DISTRIB.—On all tropical coasts.

217. Eriochloa H. B. & K.

291. **Eriochloa polystachya** H. B. & K. ; F. B. I. vii. 20. *Milium ramosum* F. I. i. 316. E. D. E 287.

Northern clearings, very plentiful.

A quick-growing grass of wet places ; a tolerable fodder.
DISTRIB.—Cosmopolitan in the Tropics.

218. Panicum Linn.

Spikelets paniculate :—
  Panicles open, with long slender branches :—
    Leaves green, flat . . . . . *proliferum.*
    Leaves glaucous, convolute . . . . *repens.*

Panicles compact, spiciform, with short adpressed branches *Myurus.*

Spikelets on the branches of a simple raceme :—

Raceme with subsecund at length spreading branches *prostratum.*

Racemes contracted or pyramidal :—

Spikelets not awned . . . . . . *colonum.*

Spikelets awned . . . . . . *Crus-Galli.*

292. **Panicum proliferum** Lamk.; F. B. I. vii. 50. *P. paludosum* F. I. i. 307.
Northern clearings, in ponds and jhils.
Vernac. *Boráti ; Kalas-nár.*

A matted floating grass; a poor fodder.
DISTRIB.—Cosmopolitan in the Tropics.

293. **Panicum repens** Linn.; F. B. I. vii. 49. *P. uliginosum* F. I. i. 308. E. D. P 75.
Northern parts, in wet places and on river-banks.
Vernac. *Barandá.*

A coarse grass and an indifferent fodder, but a very valuable mud-binding species.
DISTRIB.—Cosmopolitan in tropical and sub-tropical countries.

294. **Panicum Myurus** H. B. & K.; F. B. I. vii. 39. *P. serrulatum* F. I. i. 307.
Northern clearings, in ponds, *Heinig*!

A matted floating grass; a poor fodder.
DISTRIB.—S.-E. Asia; N. Australia; Trop. America.

295. **Panicum prostratum** Lamk.; F. B. I. vii. 33. E. D. P 72.
Jatta, among ruins, *Prain*!

A small creeping grass; an excellent fodder.
DISTRIB.—Cosmopolitan in the Tropics.

296. **Panicum colonum** Linn.; F. B. I. vii. 32. E. D. P 45.
Jatta, *Prain!*
Vernac. *Shâma.*

A slender grass; an excellent fodder.
DISTRIB.—Cosmopolitan in the Tropics.

297. **Panicum Crus-Galli** Linn.; F. B. I. vii. 30. *P. hispidulum* F. I. i. 303. E. D. P 48.
Northern clearings, rare, *Calcutta Garden Collectors*!

A rather coarse grass; a good fodder when young.
DISTRIB.—Cosmopolitan in the Tropics.

219. **Setaria** Beauv.

Panicle spiciform, cylindric; bristles with erect or spreading barbs. *glauca.*

Panicle subpyramidal, the lower involucels in segregate clusters; bristles with reversed barbs . . . . *verticillata.*

298. **Setaria glauca** Beauv.; F. B. I. vii. 79. *Panicum glaucum* F. I. i. 285. E. D. P 1207.

Jatta, *Prain*!

Vernac. *Pingi Natchi.*

An erect annual grass; a moderately good fodder.

DISTRIB.—Cosmopolitan in tropical and sub-tropical regions.

299. **Setaria verticillata** Beauv.; F. B. I. vii. 80. *Panicum verticillatum* F. I. i. 301. E. D. P 1223.

Northern clearings, rare, *Calcutta Garden Collectors*!

Vernac. *Dora-biyára.*

A rank grass; a tolerable fodder when young.

DISTRIB.—Cosmopolitan in tropical and sub-tropical regions.

220. **Chamæraphis** R. Br.

300. **Chamæraphis spinescens** Poir.; F. B. I. vii. 62.

Northern clearings, in ponds and jhils, *Calcutta Garden Collectors*!

A matted floating grass; a poor fodder.

DISTRIB.—S.-E. Asia; Australia.

221. **Oryza** Linn.

Leaves herbaceous with unarmed margins, ligule long 2-partite; panicle lax; awn very long . . . . . *sativa.*

Leaves coriaceous with spinulose margins, ligule very short; panicle spiciform; awn short, rigid . . . . . *coarctata.*

301. **Oryza sativa** Linn.; F. I. ii. 200; F. B. I. vii. 92. E. D. O 258.

Everywhere throughout the forests on the sloping alluvium of river-banks from the northern boundary to the sea-face, "wild, or as an escape from cultivation," *Heinig*!

Vernac. *Dhán.*

An annual grass; "of no economic value" (*Heinig*).

DISTRIB.—Tropical Australia.

Heinig's specimens, from various localities in the Sundribun forests, give more the suggestion of a condition 'feral after escape' than of a truly wild stock; they have stouter stems and fuller ears than undoubtedly wild plants collected in fresh-water marshes and jhils elsewhere by King and other Indian botanists. Though apparently as widely spread as the next species, *O. sativa* is rare, whereas the next is exceedingly abundant. All Heinig's specimens have very long awns.

302. **Oryza coarctata** Roxb.; F. I. ii. 206; F. B. I. vii. 93.

Everywhere in the forests on newly formed sloping alluvial river-banks, from the northern boundary to the sea-face, *Hamilton*, *Griffith*! *Ellis*! *Heinig*! *Prain*! Sea-face, on sand covered by high tides, *Prain*!

Vernac. *Bani Dhán.*

A tall, rigid perennial grass, with wiry rootstock; an excellent mud- and sand-binding plant.

Distrib.—Sind.

First discovered by Hamilton in 1796. This is the most common and most plentiful grass in the Sundribuns; it is the first species to establish itself on the compensation banks of alluvium that are formed on the opposite bank of a river whenever the 'set' of the current produces erosion. Such banks vary in size from a few square yards to several acres; wherever they occur there are closely and uniformly covered by a sheet of *Orysa coarctata.* Where the bank shelves rapidly off into deep water a narrow fringe of *Myriostachya Wightiana* is often associated with the *Orysa* at the river-edge; the upper or forest margin of such a bank becomes at times invaded by a belt of *Hargósa* (*Acanthus ilicifolius*) bushes, and by young plants of *Géngwa* (*Excœcaria Agallocha*), *Keora* (*Sonneratia apetala*), *Báen* (*Avicennia officinalis*) and the like. This belt of shrubbery gradually extinguishes the *Orysa coarctata.* If such a belt, as sometimes happens, does not form immediately, a sward of *Zoysia pungens,* mingled with tufts of *Fimbristylis ferruginea,* springs up instead on the landward side of the alluvial bank and drives the *Orysa* out. The plants of *O. coarctata* near the upper edge of such a bank rarely exceed 18 inches in height; towards the lower or river-edge they may be from 4 to 6 feet high. On the sand at the sea-face, the stems are only 4-8 inches high; they are, however, perfectly healthy and flower profusely though they are covered by every high tide. The species is one of the best sand-binders on the coast, as well as the most effective of the mud-binders on these newly formed alluvial banks.

222. Leersia Sw.

303. **Leersia hexandra** Sw.; F. B. I. vii. 94. *L. ciliata* F. I. ii. 207. E. D. L 247.

Northern clearings, in ponds, *Calcutta Garden Collectors*!

A floating grass; a good fodder.

Distrib.—Cosmopolitan in the Tropics.

223. Zoysia Willd.

304. **Zoysia pungens** Willd.; F. B. I. vii. 99. *Agrostis matrella* F. I. i. 317.

Northern clearings, very common; occasionally also in narrow patches behind alluvial river-banks throughout the forests; sea-face, common.

A wiry grass; useless as fodder; an excellent sand-binder.

DISTRIB.—Shores of Mascarene Islands; S.-E. Asia; Tropical Australia; Polynesia.

This the grass that is next most common in the Sundribuns after *Orysa coarctata;* it occurs in the northern clearings where *Orysa* is not found; frequently is associated with *Orysa* at the upper or landward edge of alluvial banks; and is plentiful along the sea-face just above tide-mark.

224. Imperata Cyrill.

305. **Imperata arundinacea** Cyrill.; F. B. I. vii. 196. *Saccharum cylindricum* F. I. i. 234. E. D. 151.

Northern clearings, general.

Vernac. *Ulu; Unu.*

A tough grass; extensively used for thatching.

DISTRIB.— Cosmopolitan in the Tropics.

225. Saccharum Linn.

306. **Saccharum spontaneum** Linn.; F. I. i. 235; F. B. I. vii. 118. E. D. S 49.

Sea-face, general on the small sand-heaps above tide-mark, in large tussocks, *Heinig*! *Prain*!

Vernac. *Khágra; Kashiya.*

A tall coarse grass; useful as a sand-binder; may also be used for thatching and for making rough ropes.

DISTRIB.—Tropical and sub-tropical parts of Eastern Hemisphere and Australia.

226. Andropogon Linn.

Scented, tall; glumes muricated . . . . *squarrosus.*
Inodorous; glumes not muricated :—
  Tall; joints of rachis and pedicels of upper spikelets compressed, with thickened margins and a translucent centre *intermedius.*
  Short; joints of rachis opaque; tips of branches of panicle bearded *aciculatus.*

307. **Andropogon squarrous** Linn. f.; F. B. I. vii. 186. *A. muricatus* F. I. i. 265. E. D. A 1007.

In large tussocks, on bunds, in northern clearings, *Calcutta Garden Collectors*! *Prain*!

Vernac. *Khas-Khas.*

A large perennial tufted grass; used elsewhere in India to make aromatic scented mats, fans, baskets and the like; root yields on distillation a fragrant oil.

DISTRIB.—Tropical Africa; India generally; Java. Possibly originally introduced to India by Arab navigators and invaders. The natural conditions are so suitable for this grass that there is no reason why it should not be wild in these northern clearings and, as a matter of fact, it is not actually cultivated.

But the tussocks are so scarce that it is perhaps more probable that the grass was originally introduced by man.

308. **Andropogon intermedius** R. Br.; F. B. I. vii. 175. *A. glaber* F. I. i. 267.

Northern and western clearings, on bunds.

Vernac. *Gandha Guráná.*

A tall grass, forming small tussocks; properties insignificant.

DISTRIB.—Tropical Africa; sub-tropical and tropical Asia; Polynesia.

309. **Andropogon aciculatus** Retz; F. I. i. 262; F. B. I. vii. 188. E. D. A 1073 and C 1053.

Northern clearings, common.

Vernac. *Chor Kanta.*

A small tufted coarse grass; a poor fodder even when young; cattle refuse it after its flowers appear.

DISTRIB.—Tropical Asia; N. Australia; Polynesia.

227. Sporobolus R. Br.

310. **Sporobolus tremulus** Kunth; F. B. I. vii. 250. *Agrostis tenacissima* F. I. i. 316.

Northern clearings, very abundant; occasional in grassy spots at forest-edge of mud-banks throughout the reserves; also at the sea-face.

A slender grass with much-matted stems (sometimes 18 in. to 2 ft. long, usually only 2-6 in. long), numerous from a hard knotted stoloniferous stock; the stolons 6-18 in. long, leafy. An indifferent fodder; a good mud-binding but less effective sand-binding species.

DISTRIB.—S.-E. Asia.

This is the third most abundant of the Sundribun grasses; in the clearings it is the only really abundant grass though even there it is always more or less accompanied by *Zoysia*, with which it is sparingly associated at the upper edge of alluvial banks and still more sparingly at the sea-face.

228. Chloris Sw.

311. **Chloris barbata** Sw.; F. I. i. 329; F. B. I. vii. 292. E. D. C 1026.

Northern clearings, at Kagdip, *Prain*! and elsewhere, *Heinig & Gammie*! *Calcutta Garden Collectors*!

A handsome tufted grass; an indifferent fodder when young; cattle do not eat it after it flowers.

DISTRIB. Cosmopolitan in the Tropics.

229. Eleusine Gærtn.

Spikelets closely imbricate, pointing forward, not awned . *indica.*

Spikelets patent, at right angles to rachis of spike, the second glume abruptly shortly awned . . . . . . *ægyptiaca.*

312. **Eleusine indica** Gærtn.; F. I. i. 345; F. B. I. vii. 293. E. D. E 186.

Northern clearings, rare, *Calcutta Garden Collectors*!

A small coarse tufted grass; an indifferent to fair fodder.

DISTRIB.—Tropics of the Eastern Hemisphere, but now introduced in tropical America.

313. **Eleusine ægyptiaca** Desf.; F. I. i. 344; F. B. I. vii. 295.

Kagdip, *Prain*!

A prostrate tufted grass; a good fodder.

DISTRIB.—Tropics of Eastern Hemisphere, but now introduced into tropical America.

This was only met with on a small patch of artificially raised ground where coal for the forest launches is kept, and is no doubt a quite recent introduction, along with coal, from Western Bengal.

230. Phragmites Trin.

314. **Phragmites Karka** Trin. VAR. **cincta** Hook f.; F. B. I. vii. 305. *Arundo Karka* F. I. i. 348. E. D. A-1539 and P 618.

Northern forests, *Heinig*! and clearings, *Kurz*! *Clarke*! *Heinig*! Vernac. *Nál.*

A tall, reed-like grass; the split stems are used to make *dharma* matting, also baskets employed in marketing; they are likewise used for the dunnage of boats, walling of pán-baris, and the like.

DISTRIB.—Tropical and sub-tropical regions of the Eastern Hemisphere and of Australia.

231. Eragrostis Beauv.

315. **Eragrostis tenella** R. & S. VAR. **plumosa** Stapf; F. B. I. vii. 315. *Poa plumosa* F. I. i. 337. E. D. E 263.

Northern clearings, occasional.

A slender annual grass; a good fodder.

DISTRIB.—India; Ceylon; Burma.

232. Myriostachya Hook f.

316. **Myriostachya Wightiana** Hook f.; F. B. I. vii. 327.

General in all parts of the forests, but rarely very abundant.

A tall stout perennial glabrous grass; properties much those of *Phragmites.*

DISTRIB.—Malay Peninsula.

This grass holds the fourth place in order of frequency in the true Sundribun forests, where it very usually is associated with *Orysa coarctata.* In cases where an alluvial newly formed bank slopes gently into deep water this is not, as a rule, seen wherever a mud-bank drops suddenly into deep water a line of *Myriostachya* marks the river-margin of the *Orysa*-field. The *Myriostachya*, however, very often occurs in localities where *Orysa* does not, and forms a fringe of reed-like grass close up to the true forest. Though generally distributed from the northern borders to the sea-face it appears nowhere to be very plentiful.

The species is doubtfully reported from S. India in the *Flora of British India*, but the only specimen of the grass from Wight's herbarium seen by the writer appears to have come from Mergui. The species has been also reported from Langkawi south of Tenasserim and has been collected by Mr. C. Curtis both in Penang and in Province Wellesley.

233. **Diplachne** Beauv.

317. **Diplachne fusca** Beauv.; F. B. I. vii. 329. *Poa procera* F. I. i. 332.
Sundribuns; *Calcutta Garden Collectors* (1845)!

A tall tufted grass.

Distrib.—Tropics of Eastern Hemisphere and Australia.

There is in the Calcutta Herbarium a Sundribun specimen of this grass, collected in 1845; it has not been reported since. It is a grass the occurrence of which in the northern clearings would not cause surprise; it should therefore be looked for, with a view to confirming this old record.

CRYPTOGAMIA.

LXXIII.—POLYPODIACEÆ.

234. **Adiantum** Linn.

318. **Adiantum lunulatum** Burm.; Synops. Fil. 114. *Pteris lunulata* F. I. iv. (758, Ed. C. B. C.). E. D. A 506.
Jatta, growing on ruins, *Prain*!
Vernac. *Kali-jhamp*.

A tufted wiry fern; properties unimportant.

Distrib.—Tropical and sub-tropical regions generally.

235. **Pteris** Linn.

319. **Pteris vittata** Roxb.; F. I. iv. (757, Ed. C. B. C.).
"Delta of the Ganges," *Roxburgh* (1795).

Of this fern, obtained from the Sundribuns, Roxburgh has left a coloured drawing which shows that it must be very nearly related to *P. longifolia* Linn. (*P. amplexicaulis* Roxb.).

Roxburgh, however, distinguishes the two very carefully as follows:—

P. vittata; stipes rising singly from a creeping stem, long and polished: pinnæ not enlarging into a stipe-clasping base, tapering to a very long fine point and (generally) fertile for only about two-thirds their length.

P. amplexicaulis (P. longifolia *Linn.*); stipes in tufts, and short ; when old scabrous ; when young, woolly : pinnæ with enlarged stipe-clasping bases, rather obtusely pointed and fertile almost to the very points.

The other characters may be theoretically assumed to be likely to break down in the case of so common and so wide-spread a fern as *P. longifolia*, but no writer on ferns has, so far, claimed that *P. longifolia* ever has an elongated, stout, creeping rootstock. It may be that those authors are right who maintain that Roxburgh's *P. vittata* is only a badly described *P. longifolia* ; it is, however, difficult for those who have had to follow Roxburgh's work elsewhere and had cccasion to test its excellence and accuracy to believe in this explanation. The care and precision of Roxburgh's diagnosis are against the assumption, and the native artist who made the figure could have had no particular object in drawing a creeping rootstock if such were not before him. In any case the theory that Roxburgh and his artist were alike in error cannot be admitted till the Sundribuns have once more been carefully searched for this fern.

236. **Ceratopteris** Brogn.

320. **Ceratopteris thalictroides** Brogn. ; Synops. Fil. 174. *Pteris succulenta* F. I. iv. (759, Ed. C. B. C.).

Rampura, among standing water in a recent and imperfect clearing, growing in ditches behind bunds, *Heinig & Gammie*! *Prain*!

Vernac. *Jangli Jhau* (*fide* Roxburgh).

A tufted succulent fern ; properties unimportant.

Distrib.—Cosmopolitan in the Tropics.

237. **Asplenium** Linn.

Veins free ; fronds once pinnate . . . . *falcatum*.
Veins copiously anastomosing ; fronds usually twice pinnate . *esculentum*.

321. **Asplenium falcatum** Lamk. ; Synops. Fil. 208.

Northern forests, *Clarke*. Eastern forests, at Supoti, on trees, *Heinig & Gammie*!

A tufted epiphytic fern ; properties unimportant.

Distrib.—Tropical Africa ; S.-E. Asia ; Polynesia.

322. **Asplenium esculentum** Presl.; Synops. Fil 244. *A. bipinnatum* F. I. iv. (756, Ed. C. B. C.).

Northern clearings, rare ; Barisal, *Clarke*!

A strong tufted fern ; fronds sometimes used as a vegetable.

Distrib.—S.-E. Asia.

238. **Nephrodium** Rich.

323. **Nephrodium aridum** Hook. & Bak. ; Synops. Fil. 291. *Polypodium semisagittatum* F. I. iv. (753, Ed. C. B, C.).

" Delta of the Ganges" *Roxburgh*; Sundribuns, *Clarke*.

A tufted fern; properties unimportant.

Distrib.—S.-E. Asia.

239. Polypodium Linn.

Fronds dimorphic, the barren ones like a sere oak-leaf, the fertile pinnatifid . . . . *quercifolium*.
Fronds all similar:—
  Fronds pinnate, drooping, often rooting at the tip *proliferum*.
  Fronds simple:—
    Fronds covered beneath with stellate tomentum *adnascens*.
    Fronds glabrous . . . . *irioides*.

324. **Polypodium quercifolium** Linn.; F. I. iv. (750, Ed. C. B. C.); Synops. Fil. 367.

Everywhere common, from the northern boundary to the sea-face.

Vernac. *Gurúr*.

An epiphytic fern with two kinds of fronds; reputed medicinal, used in chest complaints.

Distrib.—S.-E. Asia; N. Australia.

325. **Polypodium proliferum** Roxb.; F. I. iv. (752, Ed. C. B. C.) Synops. Fil. 315.

Northern clearings.

Vernac. *Depu*.

A terrestrial fern with creeping rhizome and drooping often rooting and proliferous flagelliform fronds; properties unimportant.

Distrib.—Tropical and sub-tropical Africa; S.-E. Asia; N. Australia; Polynesia.

326. **Polypodium adnascens** Sw.; Synops. Fil. 349. *P. pertusum* F. I. iv. (750, Ed. C. B. C.).

Everywhere from the northern boundary to the sea-face.

A creeping epiphytic fern; properties unimportant.

Distrib.—Tropical Africa; S.-E. Asia.

327. **Polypodium irioides** Lamk.; Synops. Fil. 360. *P. glabrum* F. I. iv. (750, Ed. C. B. C.).

Everywhere from the northern boundary to the sea-face.

Vernac. *Chitiya Bora*.

An epiphytic fern; properties unimportant.

Distrib.—Tropics of Eastern Hemisphere and Polynesia.

240. Vittaria Sm.

328. **Vittaria elongata** Sw.; Synops. Fil. 395. *Pteris angustifolia* F. I. iv (757, Ed. C. B. C.).

General, from the northern boundary to the sea-face.

An epiphytic fern; properties unimportant.

DISTRIB.—Tropical and sub-tropical regions of the Eastern Hemisphere and Australia.

241. Drymoglossum Presl.

329. **Drymoglossum piloselloides** Presl; Synops. Fil. 398. *Pteris piloselloides* F. I. iv. (757, Ed. C. B. C.).
Occasional only, but generally distributed.

An epiphytic fern; properties unimportant.

DISTRIB.—S.-E. Asia (in Ceylon but not in India except Himalaya and Bengal).

242. Acrostichum Linn.

Climbing on trees; fertile and barren pinnæ on distinct fronds	*palustre.*
Terrestrial; fertile and barren pinnæ on the same frond	*aureum.*

330. **Acrostichum palustre** Bedd. *A. scandens* Synops. Fil. 412. *Pteris scandens* F. I. iv. (758, Ed. C. B. C.).
General.
Vernac. *Dhekwa ; Dehia.*

A large scandent epiphytic fern; of little economic importance; the leaves are used as thatch.

DISTRIB.—S.-E. Asia; N. Australia; Polynesia.

331. **Acrostichum aureum** Linn.; Synops. Fil. 423. *A. emarginatum* F. I. iv. (749, Ed. C. B. C.).
Northern clearings and northern forests, very plentiful.
Vernac. *Udoban.*

A rigid tufted fern; growing in muddy places; leaves used in thatching.

DISTRIB.—Cosmopolitan in the Tropics, especially near the sea.

LXXIV.—OPHIOGLOSSACEÆ.

243. Helminthostachys Kaulf.

332. **Helminthostachys zeylanica** Hook. & Bauer; Synops. Fil. 447. *Osmuda zeylanica* F. I. iv. (748, Ed. C. B. C.).
Eastern Sundribuns in Barisal District, *Clarke*!
Vernac. *Ekbir.*

A fern with a large barren, twice palmately lobed segment, and a smaller fertile spicate segment.

DISTRIB.—Foot of Eastern Himalaya; Lower Bengal; Ceylon; Malaya; N. Australia.

LXXV.—LYCOPODIACEÆ.

244. Lycopodium Linn.

333. **Lycopodium Phlegmaria** Linn. F. I. iv. (746, Ed. C. B. C.).
Reserved forests, rare, *Heinig & Gammie*!

A pendulous epiphyte, stems dichotomously forked ; properties unimportant.
DISTRIB.—Tropics generally.

245. Psilotum Sw.

334. **Psilotum triquetrum** Sw.
Eastern Sundribuns in Barisal District, *Clarke*!

A wiry tufted herb, epiphytic on roots of *Cocos nucifera.*
DISTRIB.—Cosmopolitan in the Tropics.

VII.—NEGATIVE FEATURES OF THE SUNDRIBUN FLORA.

In the foregoing chapters our attention has been necessarily given exclusively to those species that are known to occur in the Sundribuns, because specimens from this territory actually exist in the Calcutta Herbarium, or because careful observers like Roxburgh, Clarke and Heinig have reported their presence in the region. Having regard, however, to the fact that, with some of these reported species, e.g. *Barringtonia speciosa,* reported by Heinig only, and *Ceriops Candolleana,* reported both by Clarke and by Heinig, though there is no inherent improbability in the record, there is nevertheless the possibility of some mistake in identification , it has seemed better merely to mention the fact of the record ; while a search for *all* recorded species has been urged, these quite doubtful ones have been excluded from the serial list.

This sketch of the Sundribun Flora would, however, fail to be complete without a brief reference to the general flora of which it forms an integral part, and without a list of the more salient members of this flora that have not hitherto been recorded from the Sundribuns, but that it is not impossible, where the nature of the species actually present in the Sundribuns is considered, may yet be found there. For while it is no doubt true that we probably now know all the common, and the majority of the wide-spread though rare Sundribun species, it must be recollected that the area occupied by these forests is so very extensive as to forbid its systematic exploration island by island, and that therefore in the future, as in the past, accident alone can lead to the collection of any species that is not only rare but local in its occurrence, or of most species that, even if plentiful where they occur, are confined to restricted areas within the Sundribun region.

The nature of this Littoral Flora, of which the Sundribuns form one of the most important provinces, has been so fully and philosophically dealt with by Schimper, that little has been left for others to add to his statements and conclusions.* Schimper's deductions are largely based on his own observations in the Malay Archipelago, though he has also made use of the observations of others, and notably of Kurz,† as regards the shores of the Andamans and Burma. Besides Schimper's classical work, however, reference may be made to two papers by the writer, wherein will be found an account of the corresponding flora in two non-Malayan localities that have not been dealt with either by Schimper or by Kurz; the shores of the Coco group at the north end of the Andamans,‡ and the Laccadive Archipelago.§ That some of the littoral species characteristic of the Strand-flora which occupies all the coasts from the Mascarenes to Melanesia will never be found in the Sundribuns is quite probable. Some of the characteristic species appear to be exclusively confined to rocky headlands or to shingle beaches, rarely if ever extending to sandy beaches and never appearing in tidal-swamps. For such species the Sundribun area affords no foothold. But for species that are to be found in tidal swamp-forests elsewhere in Malaya, Indo-China or India, the conditions that prevail in the Sundribuns are entirely suitable, and there is not a single Indo-Malayan swamp-forest species whose occurrence in our area would cause surprise. The limited extent of the sandy beaches along the Sundribun sea-face makes it conceivable that there is not sufficient accommodation for all the species that occur on sandy sea-shores elsewhere in the region occupied by this Strand-flora, but there is not in this fact a manifest reason why any particular species should be absent. Subjoined is therefore given a list of species, not hitherto reported from the Sundribuns, that are characteristic of other Indo-Malayan coasts and that therefore should be kept in mind as possible constituents of the Sundribun Flora. This list is in no sense exhaustive; it merely exhibits the names of striking and familiar species common on other shores of the Bay of Bengal.

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* Schimper: *Die indo-malayische Strand flora*; Jena, 1891.

† Kurz: *Preliminary Report on the forest and other vegetation of Pegu*; Calcutta, 1875: also *Forest Flora of British Burma*; Calcutta, 1877.

‡ Prain: *Journal of the Asiatic Society of Bengal*, lx. 2, p. 283, *et seq.*; list of littoral species at p. 380.

§ Prain: *Botany of the Laccadives; Journal of the Bombay Natural History Society*, vol. vii (1892) and viii (1893).

List of littoral species found on Indian Coasts but not yet collected in the Sundribuns.

Guttiferæ.

Calophyllum inophyllum.

Sterculiaceæ.

Heritiera littoralis.

Simarubeæ.

Suriana maritima.

Rhamneæ.

Colubrina asiatica.

Leguminosæ.

Sophora tomentosa.

Combretaceæ.

Terminalia Catappa.
Lumnitzera coccinea.
Gyrocarpus Jacquini.

Lythraceæ.

Pemphis acidula.

Rubiaceæ.

Stephegyne diversifolia.
Guettarda speciosa.
Ixora brunnescens.
Hydrophylax maritima.

Compositæ.

Adenostemma viscosum.

Goodenovieæ.

Scævola Kœnigii.

Sapotaceæ.

Mimusops littoralis.

Apocyneæ.

Ochrosia borbonica.
Tabernæmontana crispa.

Boragineæ.

Cordia subcordata.
Tournefortia argentea.

Convolvulaceæ.

Ipomœa denticulata.
Operculina Turpethum.

Acanthaceæ.

Eranthemum succifolium.

Nyctagineæ.

Boerhaavia repens.
Pisonia aculeata.
Pisonia excelsa.
Pisonia alba.

Laurineæ.

Hernandia peltata.

Euphorbiaceæ.

Euphorbia Atoto.

Cycadaceæ.

Cycas-Rumphii.

Liliaceæ.

Gloriosa superba.

Gramineæ.

Ischæmum muticum.
Thuarea sarmentosa.
Lepturus repens.
Spinifex squarrosus.

All of these species deserve therefore to be looked for by future explorers in the Sundribuns. The fact that the existing list of Sundribun plants includes such species as *Brownlowia lanceolata*, *Amoora cucullata*, *Carapa obovata*, *Kleinhovia hospita*, *Desmodium umbellatum*, *Erythrina indica*, *Dalbergia torta*, *Derris sinuata*, *Mucuna gigantea*, *Cæsalpinia Nuga*, *Cynometra mimosoides*, *Intsia bijuga*, *Barringtonia racemosa*, *Sonneratia acida*, *Petunga Roxburghii*, *Ægialitis rotundifolia, Launea pinnatifida, Azima tetracantha, Sarcolobus globosus, Ipomæa longiflora, Solanum trilobatum, Premna integrifolia, Clerodendron neriifolium, Avicennia alba, Salicornia brachiata, Arthrocnemum indicum, Agyneia bacciformis, Excoecaria Agallocha, Ficus Rumphii, Crinum asiaticum, Nipa fruticans, Mariscus albescens, Fimbristylis sub-bispicata, Cladium riparium, Scirpodendron costatum, Paspalum distichum, Oryza coarctata, Zoysia pungens, Myriostachya Wightiana, Acrostichum palustre,* affords at once an ample proof of the suitability of the region for the great majority of the species to which attention is now directed, and a strong presumption that some at least of the plants given in that list will be found here associated with those enumerated in the census of known Sundribun species.

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G. I. C. P. O.—No. 3562 R. & A.—27-5-1903.—350.—W. S. DeR.

From the Proceedings, Asiatic Society of Bengal, for July, 1903.

Notes on Sundribun Plants.—*By* D. PRAIN.

The writer has recently published a paper (*Records, Bot. Survey of India*, vol. ii. n. 4) dealing with the *Flora of the Sundribuns.* He had occasion there to call attention to the fact that a number of species have been recorded from this region in Roxburgh's *Hortus Bengalensis* published in 1814, and that a few of the species there mentioned have not been collected in the area since Roxburgh's time. The specimens themselves that would have verified Ruxburgh's statements were removed from Calcutta in 1828 and are now entirely lost to India. Those, however, who have to follow Roxburgh's published work are so struck by the closeness and accuracy of his observations that, when he makes a definite statement, they accept its correctness in the face of any amount of *negative* evidence.

The species that are recorded from the Sundribuns by Roxburgh, for which the record had been unverified by subsequently collected specimens when the writer's paper went to press hardly a year ago, were *Flemingia congesta*, *Mezoneuron cucullatum*, *Bruguiera parviflora*, *Arthrocnemun indicum*, *Salicornia brachiata*, *Dendrobium Pierardi* and *Pteris vittata*. Since the paper was sent to the printer, a native collector, who had been sent to obtain seeds of various Sundribun species, has brought in specimens of *Salicornia brachiata*, which he found in abundance not far from Matla (Canning Town). And immediately after the publication of the paper the writer received from a careful observer, Mr. J. Lancaster, Secretary to the Agricultural and Horticultural Society of India, an interesting note regarding *Dendrobium Pierardi*, which is worthy of being recorded.

'In June 1896, Mr. Lancaster, being unwell, was sent for a fortnight's change of air by Sir C. C. Stevens, then President of the Society, and through the kindness of Capt. Petley was enabled to join the "Tigris" which was proceeding to stock the Refuge-Houses along the seaface of the Sundribuns.

The steamer went direct to the most distant Refuge-House, two days' journey east of the Matla. While running down the lane of water leading to the house the boat took the ground, a not unusual accident at the sharp turn known as the Devil's Elbow.

The delay consequent on this was taken advantage of by Mr. Lancaster to examine through a glass the islands east and west of the position. Detecting to the east, on Bangadhony Island, a tree rather taller than usual with a forked stem and apparently a clump of orchids in the fork, Mr. Lancaster accompanied by Mr. Hogg, late of the Calcutta Police, proceeded to this tree, and climbing its gnarled and twisted trunk, obtained a clump of a *Dendrobium.* This he mounted on his return to Calcutta, and obtained flowers later on which proved it to be *Dendrobium Pierardi.* The plant is still alive in the Society's garden at Alipur, and though the block on which it was originally placed has decayed, its roots have laid hold of some wire netting and *Vanda teres* stems, and it thrives in quite as exposed a position as that in which it was found.'

Thus, though the writer was unaware of the fact, Roxburgh's record of *Dendrobium Pierardi* from the Sundribuns area, which by the way is the *locus classicus* for the species, had already been amply confirmed, and there is little doubt that similar happy accidents will in time lead to a confirmation of Roxburgh's other and as yet unverified records. The writer would esteem it a favour if members of the Asiatic Society interested in the Sundribuns would communicate with him should they contemplate visiting on official duty, or for purposes of sport, this very enticing region, when he would be glad to indicate to them what, from the botanical standpoint, still calls for observation and investigation.*

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* Since this paper was read, the Rev. Mr. Le Quesne, of Bhowanipur, has kindly communicated plants of *Randia dumetorum,* raised from seeds collected in an abandoned Sundribun settlement at Gaoroba. The writer has also just learned that in other places which mark the sites of habitations of the old dacoits and salt-smugglers who infested the Sundribuns, are to be found growing examples of *Mimusops Elengi*—the Bakúl tree.

From the Journal, Asiatic Society of Bengal, Vol. LXXIII, Part II, No. 1, 1904.

Some new plants from Eastern Asia.—By D. PRAIN.

[Received 3rd September. Read 4th November, 1903.]

While recently engaged in laying into the Calcutta Herbarium a number of Eastern Asiatic specimens, the writer has found it necessary to prepare descriptions for the following ten plants which are species that were either previously undescribed or imperfectly characterised. These descriptions he now offers to the Asiatic Society.

CONVOLVULACEÆ.

ERYCIBE Roxb.

1. **ERYCIBE ALBIFLORA** Hallier f. Bull. Herb. Boiss. v. 1052. A large climber over 50 feet long; branches angled, puberulous; branchlets angled, closely rusty-puberulous; *leaves* elliptic, base wide-cuneate, apex abruptly shortly acuminate with an obtuse tip; 3-7 in. long 1·25—3 in. wide; chartaceous, glabrous on both surfaces, dark-green above, paler beneath; lateral nerves 7-8 pairs, very oblique, ascending, distinct on both surfaces, raised beneath; secondary reticulate venation very distinct on both surfaces, but especially beneath; petiole ·4-·6 in.; long, adpressed rusty-pubescent. *Flowers* in narrow but lax terminal panicles of 5-9-flowered cymes; panicles 8-12 in. long, 1·5 in. wide. the rachis and peduncles of cymes ·1-·25 in. long, adpressed rusty-pubescent; pedicels ·15 in. long and lanceolate bracteoles rusty-pubescent. *Sepals* orbicular, rusty-pubescent externally. *Corolla* white, ·5 in across; lobes spreading, glabrous internally; interlobular spaces externally densely rusty-pubescent; lobes semicircular, margins undulate. *Fruit* ellipsoid, black, ·7 in. long ·4 in. wide. *E. subspicata* Prain Journ. As. Soc. Beng. lxiii. 2, 84 (as to the Bootan and Assam plant only); C. B. Clarke in Hook. f. Flor. Brit. Ind. iv. 181, partly (as to the Silhet plant only; Hallier f. Bull. Herb. Boiss. v. 737. *E. paniculata* Wall. Cat. 1330/1, not of Roxb.

SIKKIM: 4-6,000 ft., *Hooker*! Ryang at 1,500 ft., *King*! Rungjo 1,400 ft., *King*! BOOTAN: at 2,000 ft., *King*! ASSAM: Gauhati, *Griffith*! Golaghat, *Mann*! KHASIA: *Mann*! Nya bungalow, 2,500 ft., *Clarke*! SILHET: *Gomez Dasilva* (Wall. Cat. 1330).

This very distinct species was compared by Wallich with the quite different *E. paniculata* Roxb., and was subsequently issued, from Sikkim, under the same name in the *Herb. Ind. Or.* of Hooker and Thomson; it forms therefore some part of the *E. paniculata* of the Flora of British India. Recognising its very marked differences it was separated by the writer in 1894 and included by him (*Journ. As Soc. Beng.* lxiii. 2, 84) in *E. subspicata* Wall., a species of which there is no Wallichian specimen at Calcutta. At the same time the writer placed what now proves to be the true *E. subspicata* from Assam and Khasia with *E. Princei* Wall., to which species *E. subspicata* is very closely allied. Dr. Hallier, the greatest living authority on the difficult family *Convolvulaceæ*, when working at Calcutta accepted the writer's identification of these species with *E. subspicata*, but (Bull. Herb. Boiss. v. 737) threw a doubt on the accuracy of the identification of the specimens from Assam and Khasia mentioned above, that had been referred to *E. Princei*. Working subsequently in Europe Dr. Hallier made the discovery that these latter specimens are examples of the true *E. subspicata* of Wallich; this being the case it was necessary to provide a new name for the plant which constitutes *E. subspicata* of the Journ. As. Soc. Beng. lxiii. 2,84.

It may be mentioned here that among the plants collected by Dr. Henry in the Szemao Mountains of S.-W. Yunnan there are four gatherings of what appears to the writer to be *E. subspicata* Wall., the previously recorded localities for which are Assam, Khasia and the Taong Doung Mountains in Burma. These numbers are *Henry* 10825, 12514, 12789, 13430.

It may also be mentioned that the same collection contains, in Henry 11863, a gathering of *E. laevigata* Wall., previously known only from Sikkim, Khasia and Jaintea.

2. Erycibe Henryi Prain. A shrub with spreading shoots, or a climber; branches angled, bark fissured, glabrous; branchlets angled, glabrous or very sparingly and finely puberulous; leaves elliptic, base wide-cuneate, apex rather gradually narrowed to a subacuminate apex with obtuse tip; 3 in. long, 2 in. wide; chartaceous, glabrous on both surfaces, dark-green above, paler beneath; lateral nerves 6-7 pairs, straight not very oblique, visible above, slightly raised beneath, secondary reticulate venation very distinct beneath, obscure above, petiole ·6 in. long, glabrous. *Flowers* in terminal panicles passing into the axils of the uppermost leaves; axillary racemes and individual branches of panicle 1-1·5 in. long; peduncles ·25-·5 in. long, sparsely puberulous as are the main-rachis, the pedicels ·1 in. long, and the ovate-lanceolate deciduous minute bracts and bracteoles. *Sepals* orbicular, sparingly puberulous externally. *Corolla* white; lobes spreading, rather short, glabrous internally; interlobular spaces externally densely pubescent; lobules nearly semi-circular, margins entire. *Erycibe* n. 3 Hallier f. Bull. Herb. Boiss. v. 737.

China: Formosa; Takow, Ape's Hill *Henry* 1884!

3. Erycibe Forbesii Prain. A small tree with long spreading branches; branches cylindric, faintly puberulous; or glabrous; branchlets cylindric, adpressed rusty-pubescent; *leaves* ovate-lanceolate to lanceolate, narrowed to the cuneate base and to the acuminate apex with obtuse tip; 4—6 in. long, 1·25—2 in. wide; chartaceous, glabrous on both

surfaces, rather dark-green above, paler beneath; lateral nerves 4-5 pairs, very obliquely ascending, visible below but not at all conspicuous, not visible above; secondary venation not visible. *Flowers* in terminal and axillary panicles of 5-7-flowered cymes; terminal panicles 6·8 in. long, axillary 4 in. long; main-rachis adpressed rusty-pubescent; peduncles of individual cymes short, rusty-pubescent; pedicels slender ·2 in. long and short lanceolate bracteoles rusty-pubescent. *Sepals* orbicular, sparsely adpressed rusty-pubescent externally. *Corolla* clouded-white, glabrous within, ·4 in. across; lobes rather deeply divided; interlobular spaces closely rusty-pubescent externally; lobules nearly semi-circular, margins erose. *Erycibe* n. 24 Hallier f. Bull. Herb. Boiss. v. 739.

MALAYA: Sumatra; Lampongs, Gunong Trang, by edge of forest, *Forbes* 1454!

4. ERYCIBE LEUCOXYLOIDES King MSS. ex Ridl. in Herb. Singap. A very large climber with slender cylindric branches, bark fissured and covered with a close grey pubescence; branchlets numerous, very slender, rather distinctly angled, grey- or rusty-pubescent; *leaves* subbifarious, ovate or ovate-lanceolate, base rounded, apex subacuminate or abruptly narrowed to an obtuse tip; 1-1·75 in. long, ·4-·6 in. wide, membranous or thinly chartaceous, quite glabrous on both surfaces; rather dark-green above, paler beneath; secondary nerves about 3 pairs, very oblique and hardly visible above except in young leaves, not visible beneath even when dry and even when young; petiole ·1 in. long, grey-pubescent. *Flowers* axillary, solitary; pedicels ·2 in. long, somewhat recurved in fruit, grey-pubescent, bracteolate under the calyx. *Sepals* orbicular, sparsely pubescent on the centre externally, elsewhere glabrous except the ciliate margins. *Corolla* white, sweet-scented, ·5 in. across; interlobular spaces brown-tomentose externally; lobules broad semi-orbicular, entire. *Fruit* elliptic, black, smooth, glabrous, ·6 in. long, ·4 in. wide.

MALAYA: Singapur; climbing in secondary jungle, *Hallier*! *Ridley*, 2051! 6897! 10927! Selangor; Kwala Lumpar, *Curtis*, 2402.

5. ERYCIBE SAPOTACEA Hallier f. & Prain MSS. in Herb. Calcutta. A tree? branches slightly angled, with fissured bark, quite glabrous; *leaves* elliptic, base cuneate, apex abruptly shortly acuminate with tip obtuse; 5 in. long, 2-2·5 in. wide; firmly coriaceous; quite glabrous both sides, bright-green and glossy above, pale beneath; lateral nerves 6 pairs, distinct above and rather prominent beneath, secondary reticulate venation very distinct on both surfaces; petiole ·5 in. long, glabrous. *Flowers* in few-flowered congested, axillary subsessile cymes. *Sepals* and *Corolla* not seen. Fruit ovoid, quite glabrous, the epicarp very coriaceous, almost woody, wrinkled and fissured, with a rounded base

and conical pointed apex, 2 in. long, 1 in. in diam.; fruiting pedicels ·3 in. long, with epidermis fissured like that of the branches.

PENANG: Government Hill, *Curtis* 772!

A very distinct and striking species, the flowers of which are as yet unknown. In shape the fruit is most like that of *E. Griffithii*, but besides being about twice the size it has none of the scurfy covering of the fruit of that species. The leaves of the two are very different.

6. ERYCIBE CITRINIFLORA Griff. Notul. iv. 284. A small tree, 10–20 feet high, with strong straggling shoots; branches terete with numerous lenticels, glabrous, bark not fissured; branchlets terete or faintly angular, finely rusty-puberulous; *leaves* obovate-lanceolate, narrowed from the middle or beyond to the cuneate base, rounded or gradually narrowed to a shortly acuminate apex with obtuse tip; 5-8 in. long, 2-3·5 in. wide; coriaceous, quite glabrous on both sides; lateral nerves 7-8 pairs, very faintly impressed above, prominently subalately raised beneath; secondary reticulate venation visible but not distinct above, hardly discernible beneath; petiole ·2 in. long, finely puberulous. *Flowers* in small 12–20-flowered axillary cymes, ·5 in. across, in clusters of 3-5; peduncles ·2-·5 in. long, closely rusty-pubescent; pedicels ·1 in. long closely rusty-pubescent as are the lanceolate bracteoles. *Sepals* orbicular, rusty-pubescent. *Corolla* creamy yellow within, "smelling exactly like unripe white turnips" (*Proudlock*), ·3 in. across, glabrous within; lobes rather wide; interlobular spaces closely yellowish-brown pubescent externally; lobules ovate, slightly crenulate on their outer margins. *E. glomerata* Clarke in Hook. f. Flor. Brit. Ind. iv. 183 in part, not of Bl., nor of Wall.; Prain Journ. As. Soc. Beng. lxiii. 2, 85, not of Clarke, nor of Wall., nor of Kurz. *E. coriacea* Kurz For. Flor. Brit. Burm., ii. 213 in part, not of Wall. *Erycibe* n. 28 Hallier f. Bull. Herb. Boiss. v. 739.

TENASSERIM: Mergui; *Griffith* 5881 K.D! *Proudlock*! *Manson*! Pilai, in the Mergui Archipelago, *J. Anderson*! Tavoy; Laso Rocks, *Shaik Muqim*, 302!

Always growing close to the sea.

7. ERYCIBE WALLICHII Prain & Hallier f. Bull. Herb. Boiss. v. 382. A small tree; branches cylindric, much verrucosely lenticelled; branchlets cylindric, dark tawny-pubescent; leaves elliptic or ovate-lanceolate, base cuneate; apex rather gradually narrowed to a shortly acuminate obtuse tip, 4–7 in. long, 1·5–3 in. wide; thinly coriaceous, glabrous above, dark-green, beneath paler and glabrous except the midrib and main-nerves which even in adult leaves are beset with spreading tawny hairs; lateral nerves 9–11 pairs, straight, very slightly

oblique, raised on under surface, impressed as upper surface; secondary reticulate venation very distinct beneath, obscure above; margin of leaf slightly revolute; petiole tawny-pubescent, ·15 in. long. *Flowers* in very densely congested axillary cymes, about ·5 in. wide; peduncles very short; petioles and bracteoles tawny-pubescent. *Sepals* orbicular, externally tawny-pubescent. *Corolla* white, ·5 in. across; lobes spreading, glabrous within; interlobular spaces externally tawny-pubescent; lobules wide-falcate, margins entire. *Fruit* ellipsoid, black, glabrous, ·75 in. long, ·4 n. wide. Hallier f. Bull. Herb. Boiss. v. 738. *E. glomerata* Wall. Cat. 1338; Kurz. For. Flor. Brit. Burm. ii. 213; Clarke in Hook. f. Flor. Brit. Ind. iv. 183 (syn. *E. citriniflora* Griff. excluded), not of Bl.

BURMA: Rangoon, *Cleghorn* 188! Amherst, *Falconer* 516! Mergui; *Griffith* CULT. in Hort. Bot. Calcutta, "26/9/58."

The two species *Erycibe Wallichii* and *E. citriniflora* are confused under the name *E. glomerata* in the *Flora of British India*; it is therefore advisable to give here fuller description of both. They were not confounded by Mr. Kurz in the *Forest Flora of British Burma;* Kurz accepted the one with leaves glabrous beneath as *E. coriacea*, to which it is indeed very closely related though it is nevertheless quite a distinct species; the other, which is Wallich's *E. glomerata*, he treated as true *E. glomerata.*

The writer in *Journ. As. Soc. Beng.* lxiii. 2, 85 (1894) could not, on account of its leaves with nerves pubescent beneath, accept Wallich's *E. glomerata* as the same thing as Blume's. Unfortunately he tentatively adopted that with glabrous leaves as being possibly Blume's tree, with the result that he provided for the true *E. glomerata*, which is common in the Malay Peninsula, a new name *E. albida.* This mistake Dr. Hallier has pointed out (Bull. Herb. Boiss. v. 739) and the rectification of this mistake rendered it necessary for Hallier and the writer to provide a name for Wallich's erroneous *E. glomerata.* The adoption of the name *E. citriniflora* for the tree that is associated with *E. glomerata* in the *Flora of British India*, but that is different from Wallich's plant, is made in spite of Griffith describing the leaves of his tree as "subglabrous" only. We have, at Calcutta, examples of both the species collected by Griffith at Mergui, and his description of the distinctive odour of the flowers tallies so well with that of Proudlock that there can be no doubt as to the tree he intended as *E. citriniflora.*

8. **ERYCIBE MAGNIFICA** Prain. A strong creeper 80–100 ft. long, stem 2-3 in. in diam.; old branches ·75 in. in diam., still densely tomentose, quite cylindric, with large pith, branchlets ·3 in. in diam., densely velvety with a tawny to rusty matted tomentum; leaves elliptic or elliptic-obovate, with a narrowly truncate or rounded base, and an obtuse or sometimes retuse apex, the margin strongly revolute; 8–10 in. long, 3·5–4 in. wide; coriaceous; upper surface quite glabrous, dark-green and shining, with sometimes a silvery sometimes a rich coppery sheen; under surface velvety, pale brownish-green, the tomentum longer, looser, and sometimes whitish on the main-nerves; lateral nerves rather

straight, spreading, 12–15 pairs, rather distinctly looped along the margin, prominent beneath, deeply impressed above as is the secondary reticulate venation; petiole ·35 in. long, densely rusty-velvety. *Flowers* in short axillary racemes, sometimes clustered, of close-set 2-3-flowered individual cymules; the racemes 1-2 in. long; peduncles, short pedicels and small ovate bracts and bracteoles densely rusty-velvety. *Sepals* orbicular, densely velvety outside, quite glabrous within, coriaceous, in fruit ·2 in. across. *Corolla* ·5 in. across; lobes slightly spreading, glabrous within and waxy-white or yellow, narrow and deeply divided; interlobular spaces densely dark-brown, almost black-velvety pubescent externally; lobules very small oblong. *Fruit* ellipsoid, 1·25 in. long, 1 in. in diam., densely softly velvety, of a rich brown colour.

PERAK: Larut, *Kunstler* 3454! 3879! 6721!

In the first of his three gatherings Kunstler has noted this as a tree 50–70 feet high, but in the two subsequent ones as a large creeper, which is, from the appearance of the specimens, undoubtedly the case with the first gathering also.

LETTSOMIA Roxb.

LETTSOMIA SPHAEROCEPHALA Prain. A shrubby climber; branches irregularly angled with ridged bark, brownish on young shoots, pale-straw coloured on older twigs, sparingly beset with adpressed acicular hairs; leaves ovate-lanceolate, acute, base rounded, purplish beneath; very sparingly beset on both surfaces with adpressed hairs; length 4-5 in., width 1·5-2 in.; petiole 1-1·25 in., sparsely pubescent above with adpressed hairs. *Flowers* in compact capitate globose cymes, 1·5-2 in. across, on long slender peduncles, 2-12 in. long, sparingly adpressed pubescent; surrounded by large orbicular purple involucrant sessile bracts, 1·5 in. across, sparsely hirsute externally, quite glabrous internally, the individual flowers enveloped in similar but smaller, suborbicular to spathulate bracteoles ·5 in. long, ·25-·5 in. wide; pedicels short, adpressed-setose. *Sepals* glabrous externally except at their setose apices, the outer subacute, the inner wider obtuse, ·25 in. long. *Corolla* ·75-1 in. long, infundibuliform-campanulate, pink, softly adpressed-hirsute externally. *Berry* not seen. *Argyreia sphaerocephala* Prain MSS.

PERAK: Krian, Abu Salama, Gunong Harang Ryah, *Scortechini*!

A very striking and remarkable species. The corollas do not appear to be full-sized. Scortechini, on the ticket of his Gunong Harang Ryah specimens, has written "fruit from Maxwell's Hill" but unfortunately the fruiting specimens alluded to are not at Calcutta.

LABIATAE.

NOSEMA Prain.

Calyx per anthesin ovatus, fructifer tubulosus haud fenestratus, 2-labiatus, labiis postico oblongo integro persistente, antico rotundato integro subdeciduo. *Corollae* tubus cylindricus fauce parum ampliatus; limbus 2-labiatus, labio postico breviter 3-lobato lobo medio parum latiore emarginato, antico paullo breviore oblongo integro concavo. *Stamina* 4 declinata, filamentis liberis, posticis basi dente auctis: antherae confluentia 1-loculares explanatae. *Discus* antice vix tumens. *Stylus* apice breviter bifidus lobo antico longiore. *Nuculae* ovoideae, laeves. —Herbae erectae. Verticillastri in capitula terminalia globosa vel dense cylindracea conferta. Flores parvuli. Species 3-4, Monsunenses.

The genus now described is most nearly allied to the genus *Mesona* Bl., the two agreeing in the spurred character of the posterior filaments. To the courtesy and kindness of Mr. C. B. Clarke, F.R.S., to whom he had submitted for an expression of opinion the proposed new genus, the writer is indebted for the subjoined concise and effective diagnosis.

I. MESONA *Blume.*—*Calyx* with 2 membranous coloured lips, the upper 3-fid, the lower entire. *Inflorescence* interrupted; fruiting calyces fenestrate with transverse bars, held up on pedicels.

II. NOSEMA *Prain.*—*Calyx* with 2 membranous coloured lips, both undivided. *Inflorescence* dense; fruiting calyces not transversely barred, subsessile, the pedicels finally buried in the agglomerated calyces.

1. NOSEMA CAPITATUM Prain. A branching herb over 15 in! in height; stems 4-grooved, with rounded angles, beset with adpressed reflexed hairs. *Leaves* opposite, narrowly oblong, tapering from below the middle to the cuneate base with entire margin, margin elsewhere finely crenate, apex obtuse or subacute; chartaceous, pubescent on both surfaces, but especially on the nerves beneath; lateral nerves 9-10 pairs, oblique, straight, rather close-set, conspicuous; length 2-2·5 in., width ·6-·75 in.; petiole pubescent ·25 in. long. *Flowers* in dense terminal capitula ·25-2 in. long; *calyx* in fruit ·15 in. long, upper lip half as long as tube, lower lip less than half as long as upper and soon deciduous; tube not fenestrately transversely barred, densely tawny-tomentose with spreading hairs; *corolla* half as long again as calyx, both lips sparsely pubescent externally; *stamens* exserted, declinate, the posterior pair inserted higher up than the anterior and strongly toothed just above their bases. *Nutlets* all ripening, ovoid, glabrous, smooth.

INDO-CHINA: Siam; Kanboerie, *Teysmann*!

In Herb. Kew. there are two gatherings from Java, by Junghuhn (nn. 8, 51), of which the writer has seen ripe fruits. As to calyx and nutlets they agree exactly

with the Siam plant, and may prove only a variety. But the inflorescence of the Java plant is narrower, denser, and more hairy than that of the Siam plant. This Java plant is written up in Herb. Kew. as *Mesona* sp. nov. Bentham MSS. [1879] and for the moment may bear the name *Nosema capitatum* VAR.? *javanica*, C.B. Clarke MSS.

There are two other distinct species of *Nosema* in Herb. Kew.

2. NOSEMA PRUNELLOIDES *C. B. Clarke; leaves* ovate-oblong, 1-1·25 in. long; lateral nerves mostly 7 pairs. *Mesona prunelloides* Hemsl. in Forbes & Hemsl. Journ. Linn. Soc. xxvi. 267.

CHINA: Pakhoi, *Playfair* 110.

3. NOSEMA TONKINENSE, *C. B. Clarke MSS.; leaves* narrow-oblong, up to 1·5 in. long, ·25 in. wide; lateral nerves about 5 pairs. *Mesona chinensis* Herb. Kew. partim, non. Benth.

INDO-CHINA: Tonking; *Balansa*, 993.

From Indian Planting and Gardening, vol. xii., No. 15., p. 345; April II., 1903.

Review.

FLORA SIMLENSIS.*

THE complaint is often made that it is difficult for those holidaying at hill stations to learn anything regarding the plants and flowers they meet with in their walks abroad. This work removes all ground for such complaint on the part of visitors to Simla, and it will go some way towards meeting the requirements of residents in other North-Western hill stations. The idea of preparing this *Flora* was a consequence of Sir Henry Collett's own experience of the trouble involved in making out the flowers of Simla from the *Flora of British India*, in which work the 1,300 species of the Simla district are embedded among the 14,000 that the larger work includes. Much is often made by the ill-informed critic of the difficulty this involves. As a matter of fact the difficulty is largely imaginary; given a copy of the *Flora of British India*, some training in the use of such a book, and a little capacity for taking pains, an intelligent student may easily identify his plants from Sir Joseph Hooker's work. The trouble as regards the *Flora of British India*—and a very real trouble it is—lies in the fact that the work fills seven substantial volumes, and on this account is not suitable for use out of doors. For field study smaller local works, more compact in form, and at least as concise in style as the *Flora of British India* itself, are required. In the preface to the closing volume of his great work Sir Joseph Hooker points out that one of the higher purposes which he hopes that work may serve is the preparation of Local Floras, like this which Sir Henry Collett has prepared for the Simla district.

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* *Flora Simlensis*: A handbook of the flowering plants of Simla and the neighbourhood, by the late Col. Sir Henry Collett, K.C.B., F.L.S., Bengal Army, with an Introduction by W. Botting Hemsley, F.R.S., F.L.S., Keeper of the Herbarium and Library, Royal Botanic Gardens, Kew, and 200 Illustrations in the text, drawn by Miss M. Smith, Artist at the Herbarium, Royal Botanic Gardens, Kew, and a Map. Calcutta and Simla, Thacker, Spink and Co. London, W. Thacker and Co., 2, Creed Lane, E.C. 1902. 8vo., pp. lxviii, and 652.

As regards Sir Henry's work, it is sufficient to say that it stands the test of close examination, and that its accuracy on the crucial points as to which we have consulted it, marks it as a thoroughly reliable guide to any trained botanist who may find himself in the Simla Hills. At the same time the neatness and simplicity of its definitions, with nothing superfluous added and nothing essential omitted, render it an ideal guide for those who may be beginning the study of the varied flora of the Indian Empire.

Another point of which too much may be made by the hasty critic, is the fact that the preparation of this work should have occupied the last years of Sir Henry Collett's life, and should have only been begun after he had retired from active service. That a man of Sir Henry's mental capacity and with Sir Henry's professional training should not only have undertaken to write a *Flora of Simla*, but should have done the work so admirably, instead of being accepted, as we grieve to find it is, as a matter for surprise, ought rather to be taken as an incentive to others, similarly gifted, to go and do likewise. Keen powers of observation, the capacity for sure discrimination, and for sound and rapid generalisation, with a happy combination of boldness and of prudence, are qualities that go to the making of the ideal soldier; they are also precisely the qualities that are required in the ideal systematist. They are natural gifts, denied to many soldiers as they are to many men of science, who are nevertheless able to do good and conscientious work suited to their abilities. But if these natural faculties exist, and if chance should happily lead the possessor to turn them to account in his leisure moments in closely observing natural facts, there is no reason why the able and active soldier should not also become a good field botanist, any more than that he should, as we know the able and active soldier often does, become a good sportsman. A good field botanist Sir Henry Collett undoubtedly was, and had he done no more than make the fine collections he made in Afghanistan, in the Himalayas, on the Eastern Frontier and in Indo-China, his memory must have lived in the annals of Indian Botany as the memory of many a mighty hunter lives in the annals of Indian Shikar. Where, however, Sir Henry Collett's greatness showed itself so markedly was in his mastery of himself, and in the capacity he displayed on his retirement for applying to his work the discipline he had hitherto so happily exercised on those under his command. Only the possession of this power could have enabled him to face the task of codifying his wide and varied field knowledge, and accomplish the feat of turning himself into a good systematic writer.

The history of its preparation and the development of its author's powers gives to this Simla *Flora* a feature that is rare in works of the kind. It is true that unless the writer of a flora possesses all the instincts of the naturalist his book will not be of the highest value for field work. In the case, however, of most good systematic writers the increase of their expert knowledge has gone hand in hand with the development of their instincts as naturalists, so that works like the present, though they appeal to such as are in like case with their authors, fail at times to meet the difficulties of the beginner. In the case of Sir Henry Collett's work we have a *Flora* prepared by one who was literally a field naturalist first and an expert writer afterwards. This fact gives his work its peculiar value. If his own severity as a critic of what he wrote has given us a volume that satisfies the requirements of the trained botanist, his own knowledge of the requirements of the uninitiated has enabled him to anticipate difficulties, unknown to the expert, that beset the ardent amateur. The excellence of the illustrations which have been provided calls for our admiration of the skill with which the artist has dealt with her subject; the happiness of their selection by the author calls for equal praise. Both author and artist, indeed, deserve the gratitude of those whom Sir Henry had particularly in view: people like himself, taking not only an æsthetic but an intellectual interest in what they see, who in early life have received no systematic training.

The memory of Sir Henry Collett will live in the minds of those who came under the influence of his charming personality so long as life itself remains to them; and one of the greatest solaces that the appearance of this work gives to the friends who mourn his untimely death is the reflection that, through it, coming generations of Indian residents will be able to form some impression of the life and labours of one of the best of men.

From the Journal, Asiatic Society of Bengal, Vol. LXXIII, Part II, No. 2, 1904.

Notes on the Roxburghiaceæ, with a description of a new species of STEMONA.—*By* D. PRAIN.

[Read 1st June, 1904.]

In 1892 a native collector, in the employment of the Royal Botanic Garden, sent from the Shan Hills a specimen of a *Stemona* which appeared to be a marked variety *S. Griffithiana* Kurz, a species first described by Griffith in his *Journal of Travels*, p. 149, but there left without a name, though Griffith indicated his belief that it represented a new genus of *Roxburghiaceæ*. The only salient character by which it differs from the other known species of *Stemona* is, however, its erect instead of climbing habit. Two years ago another plant collector brought with him from Lower Burma living examples of Griffith's original plant, which were found, on flowering, to agree exactly with the original description drawn up by Griffith, but to deviate in certain respects from the description given by Kurz in the Society's *Journal* for 1873.

During the present year Mr. Burkill has sent from Burma (Katha) yet another living plant which has flowered in the Botanic Garden side by side with the plant referred to above. Mr. Burkill's plant is found to agree absolutely with the Shan Hill specimen already alluded to, and to differ so markedly from the Griffithian one as to deserve to be regarded as a distinct species. The necessary description has been accordingly prepared and is now offered to the Society. The task of describing this new species has involved an examination of all the material of this natural order present in the Calcutta Herbarium and a consultation of various references to its species. Advantage has therefore been taken of the opportunity afforded by this study to draw up a key that may be of use in discriminating the various species; in the list that follows the key notes are given, enlarging the existing knowledge of their nomenclature and distribution as well as of the distribution of *Stichoneuron*, the only other Indian genus belonging to this order.

1. STEMONA Lour.

Key to the species.

Leaves whorled or opposite :—
  Leaves sessile or shortly petioled, 3–4-nate, 3-veined ... *sessilifolia.*
  Leaves long-petioled, more than 3-veined :—
    Leaves 3–6-nate, 5–7-nerved ... ... *japonica.*
    Leaves opposite at least below, sometimes alternate towards ends of branches :—
      Leaves oblong-cordate, 7–13-veined, peduncles 1–2-flowered ... ... *tuberosa.*
      Leaves ovate-cordate, 7-11-veined; peduncles 2–3-flowered ... ... *moluccana.*

Leaves all alternate, long-petioled :—
  Stems twining :—
    Leaves ovate-cordate :—
      Stems slender; peduncles 1–2-flowered; leaves 7-veined ... ... *jacaniva.*
      Stems stout; peduncles 3—more-flowered; leaves 13–15-veined ... ... *Curtisii.*
    Leaves oblong :—
      Leaves truncate at base, 7–10 in. long, 9–11-veined; stem stout ... ... *Kurzii.*
      Leaves cuneate at base, 3 in. long or less, 7-veined; stem slender ... ... *minor.*
  Stems erect; leaves ovate-cordate; main-nerves 13–17 :—
      Flowers greenish-white flushed with pink; perianth-lobes linear lanceolate, 1 in. long ... ... *Griffithiana.*
      Flowers brownish-red; perianth-lobes ovate-acute, ·6 in. long ... ... *Burkillii.*

1. **Stemona sessilifolia** Miq. Prol. Fl. Jap. 386 (1867); Franch. & Savat. Enum. Pl. Japon. ii. 92.

Roxburghia sessilifolia Miq. Ann. Mus. Bot. Lugd. Bat. ii. 211 (1866).

Japan.

Figured by Yokusai in *Somoko Zusets* ii. (2 ed.) t. 55.

2. **Stemona japonica** Miq. Prol. Fl. Jap. 386 (1867); Franch. & Savat. Enum. Pl. Japon. ii. 92.

Roxburghia japonica Blume, Enum. i. 9. (1827).

Japan.

Figured by Yokusai in *Somoko Zusets* ii. (2 ed.) t. 56.

3. **Stemona tuberosa** Lour. Flor. Cochin-Chin. 404 (1790); Flor. Brit. Ind. vi. 298.

Inhame maderasp. foliis binis pulchre venosis Petiv. Gazophyl. 50, t. 31, f. 6 (1702).

Ubium polypoides album Rumph. Herb. Amboin. v. 364, t. 129 (1750).

Dioscorea oppositifolia Linn. Sp. Pl. 1032 in part (1753).

Roxburghia gloriosoides Jones in Roxb. Corom. Pl. i. 26, t. 32 (1795).

R. viridiflora Sm. Exot. Bot. i. 111. t. 57. (1804).

R. gloriosa Pers. Syn. 412 (1805).

R. Stemona Steud. Nomencl. (2 ed.) ii. 475 (1841).

Stemona gloriosoides Voigt Hort. Suburb. Calcutta. 650 (1845).

INDIA: Circars! INDO-CHINA: Assam! Silhet! Khasia! Jaintea: Naga Hills! Chittagong! Siam (*fide* Kunth); Cochin-China (*fide* Loureiro). CHINA: Hupeh! Formosa! PHILIPPINES: Luzon! MOLUCCAS! (*fide* Rumphius).

Dioscorea oppositifolia Linn., Sp. Pl. 1032, is based on two plants one being the *Dioscorea foliis oppositis ovatis acuminatis* of the *Flor. Zeylan.*, p. 361, which still is accepted as *D. oppositifolia* Linn.; the other plant to which, in Linnaeus' work, the name gave cover, is the *Inhame maderasp. foliis binis pulchre venosis* of Petiver (*Gaz.* 50, t. 31, f. 6). The expression 'pulchre venosis' ought alone to have been sufficient to exclude Petiver's plant from association with the Ceylon one, and a cursory glance at the figure could not fail to show that the two did not agree. It, however, occurred to Mr. Burkill and myself, who have been of late engaged in studying the Indian *Dioscoreas*, that Petiver's plant might not be a *Dioscorea* at all. We therefore referred the subject to the Keeper of the Botanical Department, British Museum, in which institution the actual specimens from which Petiver's drawings were made are preserved. The result has been that our friend, Dr. Rendle, to whom the enquiry was entrusted, finds that the plant in Petiver's collection which Linnaeus has included in his *Dioscorea oppositifolia* is really *Stemona tuberosa.*

Occasionally, but very rarely, the leaves low down may be 3-nate, and occasionally those at the tips of branches are alternate, but this has not been noticed by the writer on any of the stout main-stems.

4. **STEMONA MOLUCCANA** Prain.

Ubium polypoides rubrum Rumph. Herb. Amboin. v. 365 (1750).

Roxburghia moluccana Blume, Enum. i. 9 (1827); Kunth, Enum. v. 289.

MOLUCCAS: (*fide* Rumphius); Amboina, *Barclay*!

This species is very closely related to *S. tuberosa* but differs, in Barclay's specimen, in shape of leaf and style of inflorescence, in both which particulars it resembles *S. Curtisii;* that species, however, has smaller flowers and only alternate leaves: according to Rumphius the present plant has the leaves scattered towards the ends of the branches, opposite below.

5. STEMONA JAVANICA, Engl. Natürlich. Pflanzenfam. ii. v. 8, (1888).

Roxburghia gloriosoides Zoll. Plant. Jav. n. 2441 (1850); Hassk. Neuer Schluess. Herb. Amboin. 275 (1864); not of Jones.

R. javanica Kunth. Enum. v. 288 (1850).

JAVA: Malang; in woods near the sea, *Zollinger*!

There is no doubt as to the validity of this species, which was proposed by Kunth and has been since accepted by Engler. Besides having thinner, smaller, and fewer-veined leaves than *S. tuberosa*, its flowers, which are noted by Zollinger in his field-note as dark-red, are about one-fifth the size of those of that species.

6. STEMONA CURTISII Hook. f. Flor. Brit. Ind. vi. 298 (1892).

MALAY PENINSULA: Penang; Waterfall, *Curtis*! Perak; Batu Gaja, *Scortechini*! Lumut, *Ridley*!

7. STEMONA sp., ? nov.

Roxburghia gloriosoides Kurz in Herb. Calcutta, hardly of Jones.

BURMA: Pegu; Laelo Choung, *Kurz*!

Leaves all alternate, oblong, 7-10 in. long, 3-in. wide, base truncate.

This has narrower and firmer leaves than is usual in *S. tuberosa*, though *some* of our examples of that plant have leaves very like those of the present one. In texture and also in shape its leaves accord best with those of *S. minor*, but they are much larger and the stem is much stouter than in that plant. But for the fact that the leaves on a stout main-stem are alternate, a character never met with in true *Stemona tuberosa*, the identification of Kurz might almost have been accepted. Meanwhile, however, this is one of the cases where it is safer to doubt the determination, and when fuller material is available it may be necessary to recognise this as a distinct species, *S. Kurzii*. For the present it must be accepted as, at least, a distinct variety of *S. tuberosa*.

8. STEMONA MINOR Hook. f. Flor. Brit. Ind. vi. 298 (1892).

Roxburghia gloriosoides Wight, Icon. t. 2061 (1853), not of Jones.

R. gloriosoides var. *minor* Thw. Enum. Pl. Zeyl. 432 (1864).

S. INDIA: Malabar, *Wight*! CEYLON: Trincomali, *Glenie*.

The relationship of this to *S. tuberosa* is much the same as that of the preceding form; the most salient character being again that here all the leaves are alternate. This plant, however, further differs in being distinctly smaller in all its parts, and there is no doubt that Sir Joseph Hooker is amply justified in considering it a distinct species.

9. STEMONA GRIFFITHIANA Kurz in Journ. As. Soc. Beng. xlii. 2, 109 t. 10 (1873); Hook. f. Flor. Brit. Ind. vi. 299.

[*Gen. Nov.* near *Roxburghia*] Griff. Journ. Trav. 149 (1847).

INDO-CHINA: Burma; valley of the Irrawaddy from Ava to Pegu.

The description given by Kurz, which, so far as reference to coloration goes, has been followed in the *Flora of British India*, deviates somewhat from the original account written by Griffith in the field. Most of the specimens which Kurz had before him when writing his description are in Herb. Calcutta now, but there is a note in Kurz's handwriting that indicates the removal of two of these subsequent to the preparation of his description. There is nothing to show that Kurz had the advantage of studying an original Griffithian specimen; and while most of the specimens named *Griffithiana* by Kurz himself belong to the plant that *does* accord exactly with the description drawn up by Griffith, one of Kurz's specimens appears to the writer to belong to the species next to be described. In any case the account that Kurz gives of the colour of the flower seems to suggest that Kurz must have seen, in the field, plants of both species. Though the two plants are very closely allied the writer is satisfied, after a careful examination of the two in the living state, and while flowering side by side, that they are distinct, and that the distinction is too marked to admit of their being deemed merely two varieties of one species. Both plants, it may be noted, begin to flower before the leaves are fully developed, but flowering does not cease, in either case, till some time after the leaves have attained their full size.

The diagnosis between the two plants is as follows :—

Internodes less than ·5 in. long; perianth-segments 1 in. long or rather longer, linear-lanceolate, white with a greenish tinge externally and a pinkish tinge within; fleshy keel of filaments purple ... ... *Griffithiana.*

Internodes more than 1 in. long, perianth-segments ·5–·6 in. long, ovate-lanceolate, greenish-red externally, dull red within; fleshy keel of filaments cobalt-blue ... *Burkillii.*

10. STEMONA BURKILLII Prain.

BURMA: Shan Hills; *Abdul Huq*! Katha; *Burkill*!

Rootstock stout, hypogaeous. *Leaves* ovate, acute, slightly cordate. 3–4 in. long, 2·5–3 in. wide, 13–15-nerved; petioles 4–6 in. long, alternate, *Stems* slender, erect, 6-18 in. high; internodes 1 in. or more long. *Flowers* greenish-red externally, dull-red within, bracts ·5 in. long, lanceolate; pedicels 1·5 in. long, strict; perianth-segments ·5-·6 in. long, ovate-lanceolate, acute. *Stamens* 4, filaments broad, dull-red, with sometimes one, sometimes 2 linear fleshy cobalt-blue keels on inner face; anthers yellow. *Fruit* not seen.

Though so nearly related to the foregoing species this plant differs in too many characters to be satisfactorily dealt with as a mere variety of *S. Griffithiana.* The roots, which were brought to Mr. Burkill's notice during a recent tour in Burma, in connection with the enquiry for species of *Dioscorea,* are known as *Tham-yan-nyet.* They are not eaten but are used as an insecticide.

2. STICHONEURON HOOK. F.

STICHONEURON MEMBRANACEUM Hook. f. Flor. Brit. Ind. vi. 299 (1892).

Add to localities of F.B.I.:—

MALAY PENINSULA: Perak; *Scortechini*!

As regards distribution we find that *Stemona* exhibits in a very striking fashion the peculiarities characteristic of many of the genera that are confined to the monsoon-region. It is, to begin with, remarkably wide-spread within that area, extending from Malabar and Ceylon to Japan on the one hand, and to the Philippines and the Moluccas on the other. But with the exception of the wide-spread *Stemona tuberosa*, which occupies almost the whole of the central portion of this large area, the individual species are much localised. In this instance, no species has so far been actually obtained from the Himalayan region, through the central species, *S. tuberosa*, has been collected by Mr. G. Mann in the Charduar, near the base of the Eastern Himalaya. The genus *Stichoneuron* occurs in Khasia and Silhet; and has been gathered again in the Malay Peninsula. The subjoined tabular statement shows that of the 10 species known, one occurs in Ceylon, two in India, four in Indo-China, one in China, two in Japan, one in the Philippines, two in the Moluccas (Malaya east of the Wallace line), and two in Malaya proper west of the Wallace line. Of the Indian species, one is confined to Malabar and Ceylon and is the only species in these areas. Of the Indo-Chinese form three are endemic; as are both the Japanese, both the western Malayan, and one of the two Moluccan species.

Table of distribution of the genera Stemona *and* Stichoneuron.

SPECIES.	Ceylon.	Malabar.	Circars.	Assam.	C.China.	Formosa.	Japan.	Cochin China.	Burma.	Siam.	Philippines.	Moluccas.	Java.	Malay Peninsula.	REMARKS.
Stemona minor ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	Group of closely related forms.
tuberosa	...	...	1	1	1	1	...	1	...	1	1	1	...	...	
moluccana	...	...	...	...	...	...	...	...	...	...	...	1	...	...	
Kurzii ...	...	..	...	...	...	...	...	...	1	...	...	...	...	...	
japonica ...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	
sessilifolia	...	...	...	...	...	...	1	...	...	...	...	...	...	...	
Curtisii ...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	
javanica...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	
Griffithiana	...	...	...	...	...	...	...	...	1	...	...	...	...	...	Do.
Burkillii...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	
	1	1	1	1	1	1	2	1	3	1	1	2	1	1	
Stichoneuron membranaceum	...	...	...	1	.	...	...	...	...	...	...	...	...	1	

From the Journal, Asiatic Society of Bengal, Vol. LXXIII, Part II, No. 2, 1904.

The Asiatic species of ORMOSIA.—*By* D. PRAIN.

[Read 1st June, 1904.]

In the *Journal of the Asiatic Society of Bengal*, vol. lxix, pt. 2 pp. 175, *et seq.*, a list of the Asiatic species of the genus *Ormosia* was published. The list included 22 species. Since 1900, when the list appeared, further material has been communicated from S. China. This material includes examples in flower of one species, *O. yunnanensis*, of which previously only the fruits were known; it also includes material both in flower and in fruit of a distinct new species that has been described by Mr. S. T. Dunn, in the *Journal of the Linnean Society*, under the name *O. striata.* More recently Mr. F. B. Manson, of the Indian Forest Department, has sent from Tavoy a specimen representing yet another species. As it is desirable, therefore, to bring the census of the genus, published four years ago, up to date, the necessary notes, references and descriptions are now offered to the Society.

The species reported from Tavoy is a member of the group *Macrodisca*, within the section *Ormosia* proper, and its place in the genus, most in accordance with the arrangement adopted in the previous paper, will be within the group mentioned, and immediately before 7. *Ormosia travancorica* Bedd. The new Chinese species is compared by Mr. Dunn with *O. gracilis* Prain, and in general appearance this is the species that it most resembles. But while it is undoubtedly, like *O. gracilis*, a member of the section *Ormosia* proper, the structure of the fruit and the size of the seeds are repugnant to its inclusion in the group *Macrodisca* to which *O. gracilis* belongs. As a matter of fact the fruit does not accord with the characters of any of the three sub-sections or groups that it has been found advisable to recognise within the section *Ormosia*, but shows that *O. striata* probably deserves to be considered the type of a distinct sub-section, the "Striatæ," connecting *Macrodisca* with *Amacrotropis*, to be placed alongside and on an equal footing with the sub-section *Layia*, with which last it agrees in having the valves thickly woody and the seeds small, but from which it differs in not having the pods septate.

1. Ormosia robusta *Bak.*

Add to localities hitherto recorded:—

Lower Burma: Tavoy, *Shaik Muqim*!

6b. Ormosia tavoyana *Prain*; leaflets 7—9, oblong, dull pale-green, distinctly stalked; flowers in axillary racemes, pedicels very short; pod large, ovate-oblong, with thick valves rounded on the back.

Burma: Tenasserim; Tavoy, *Manson's Collector* n. 301!

A tree, with thickish, dark-brown, glabrous branches. *Leaflets* thickly chartaceous and rigid in texture, pale-green, quite glabrous on both surfaces, ovate-oblong, acute, terminal rather the largest, 3·5—4·5 in. long, 1·5—2 in. wide, main-nerves about 5 pairs curving forwards and rather prominent beneath; petiolules ·25 in. long, and main-rachis 6—8 in. long, quite glabrous. *Peduncle* glabrous, 2·5 in. long, stout as is the rachis of the raceme 1·5 in. long, which is glabrous or slightly puberulous towards the apex. *Flowers* not seen. *Fruiting pedicel* stout, ·25 in. long. *Pod* umber-brown, 2·75 in long, 1·8 in. wide, ·75 in. thick. *Seed* oblong, ·75 in. long, scarlet.

This species most resembles *O. travancorica* but has larger, more acute leaflets and a larger pod.

The Burmese name is *Talaing-zin.*

¶ Striatæ. [Sub-sect. nov. post ¶ Layiam ponenda.]. Pods with thickly woody valves, not septate between the small, often solitary seeds.

13b. Ormosia striata *Dunn, Journ. Linn. Soc.* xxxv. 492, (1903).

China: Yunnan; mountains in Western Szemao, 4000—5000 ft., *Henry* 11886! 12843; 12979!

The outer layer of the valves of the pod is firmly coriaceous, the endocarp is woody and subcrustaceous; the apex like the base is oblique and projects as a straight or slightly uncinate beak at right angles to the long axis of the pod and diagonally opposite to the stipe.

15. Ormosia yunnanensis *Prain, Journ. As. Soc. Beng.* lxix. 2, 183.

Add to description:—*Corolla* white. *Stamens* 10, all fertile, exserted; anthers oblong, versatile.

Add to citation of gatherings from China:—Yunnan; mountains to the south of Szemao, 5000 ft., *Henry* 12885!

RECORDS

OF THE

BOTANICAL SURVEY OF INDIA

VOLUME III—No. 2.

THE VEGETATION OF THE DISTRICTS OF HUGHLI-HOWRAH AND THE 24-PERGUNNAHS.

BY

D. PRAIN.

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THE VEGETATION OF THE DISTRICTS OF HUGHLI-HOWRAH AND THE 24-PERGUNNAHS.

By D. Prain.

I.—INTRODUCTION.

It has often been impressed upon the writer that a concise list of the plants to be met with in the vicinity of Calcutta might be useful to those whom duty or pleasure lead to reside in that city. The present paper is an attempt to supply such a list.

This is by no means the first attempt to do what is required. It appears probable from letters that have been consulted by the writer, written between 1796 and 1828 by Dr. Francis Buchanan (afterwards Hamilton), once Superintendent of the Royal Botanic Garden, that in its original form the *Flora Indica* of Roxburgh only consisted of the brief diagnoses which accompany all the species, and that the long and lucid descriptions which in the work, as we know it, are given for many, but not all, of the plants dealt with, were intercalated subsequently. It further appears that manuscript copies of the original *Flora* were available for use as early as 1798 by at least some of Roxburgh's botanical friends. This, though it certainly covered a wider field than the vicinity of Calcutta, or indeed than the Presidency of Fort William, may be considered the first attempt to provide a list such as is required.

The first serious attempt to provide exactly what is wanted was made in 1839 by J. W. Masters on behalf of the members of the Agricultural and Horticultural Society of India. The title of Masters' paper, *Calcutta Flora, containing a Synopsis of Plants indigenous to or cultivated in the vicinity of Calcutta, arranged according to their natural families; with observations on the properties, and manner of cultivating some of the most interesting*,[1] shows that the design of the author was somewhat ambitious: it is not therefore surprising to

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[1] Transactions of the Agricultural and Horticultural Society of India, vii. 39-85 (1840). The paper was read 12th June 1839.

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find that he only succeeded in carrying his synopsis as far as the *Malvaceæ*, and although it appears that he had intended to resume the project at a later date he never did so.[1] The portion actually published was, as he himself explains, only a rough copy of a portion of the projected work, and if one may judge from this portion it is possible that it would have proved less useful than Masters anticipated. The whole list, Masters says, was to have included 3,972 species.

It is probable that one reason why Masters never resumed his *Calcutta Flora* was that about the same time Voigt was engaged in preparing his well-known *Hortus Suburbanus Calcuttensis*, published at Calcutta in 1845. J. O. Voigt, one of the most painstaking botanists who has worked in India, was appointed Surgeon to the Danish Colony of Serampore in 1827, when 29 years of age. Under the influence of the veteran Dr. Carey he gave much of his spare time to botanical study, and in 1834, on Dr. Carey's death, he took charge of Dr. Carey's garden at Serampore, and out of pious regard for Carey's memory set to work almost at once to put into permanent form the results of Carey's botanical and cultural work during the preceding 30 years.

The Serampore Garden, in Carey's and Voigt's day almost as important as the Botanic Garden at Shibpur, worked hand in hand with the latter institution. Thus it was Dr. Carey, and not the Honourable Company, who in 1814 undertook the task of publishing Roxburgh's *Hortus Bengalensis*, in which are catalogued the 3,500 species in cultivation in the Royal Botanic Garden between 1786 and 1814. It is on this invaluable work which, but for the existence of the Serampore Garden, we should never have possessed, that Voigt's larger one was based. Voigt's *Hortus*, however, included the entries in Carey's *Garden Receipt Book*, so that it dealt with all plants that had lived at Serampore, but had succumbed at Shibpur, and all plants introduced at Serampore between 1814 and 1834. It included besides, the catalogue drawn up by Masters to serve as the basis of that writer's abandoned *Calcutta Flora*, showing all the plants introduced into the Shibpur Garden between 1814 and 1836. It included too a list by Dr. Wallich of plants introduced to the Royal Botanic Garden between 1836 and 1840, supplemented by a list made by Voigt himself, while acting in 1842 for Wallich, up to 1843. Voigt's superintendence at Serampore enabled him to include all the species introduced there from 1834 to 1843.

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[1] The paper concludes as follows (*Trans. Agri.-Hort. Soc. India* vii. 85):—
"Here I am obliged suddenly to break off being engaged in more important "matters; the whole of my time is taken up with them, and I cannot devote any "more to this subject at present.—*J. W. Masters. May 3, 1839.*"

The unfortunate illness and death of Voigt in 1843 prevented the issue of the work by the author. His manuscript, as it stood at the end of 1841, was made over to the Agricultural and Horticultural Society, and the printing of the work at the Society's expense was begun. After 16 pages had been printed, some hitch arose and the printing was suspended. However, after Voigt's death, Griffith, who considered the work very valuable, arranged to see it through the press. Before, however, the Indices were commenced Indian Botany had to lament Griffith's untimely death, and Mack who, in consequence, undertook their preparation also died before they were completed, so that it was 1845 before the work was issued.

The scope of the work is hardly completely indicated by its title, which is:—*Hortus Suburbanus Calcuttensis: A Catalogue of the Plants which have been cultivated in the Hon. East India Company's Botanical Garden, Calcutta, and in the Serampore Botanical Garden, generally known as Dr. Carey's Garden, from the beginning of both establishments* (1786 *and* 1800) *to the end of August,* 1841: *drawn up according to the Jussieuan arrangement, and mostly in conformity with the second edition* (1836) *of Lindley's Natural System of Botany.*[1]

It contains remarks on each natural order, the names of the plants enumerated, the Bengali names of those indigenous to or commonly cultivated in Lower Bengal, the habit, time of flowering and the flower of each individual species; the habitat, properties and uses of each. The number of natural families dealt with is 278, of genera 1,737, of species 5,515.

Of the great merit of the work it is hardly necessary to speak. Yet the value of the *Hortus Suburbanus* has been found, by those who have had to work with Indian plants elsewhere than in Lower Bengal, to be comparatively small. Hooker and Thomson, for example, have pointed out that the *Hortus* is "not available as a work of reference, nor can we refrain from expressing our regret that talents of so high an order should have been devoted to a work of so little practical use." This is in one sense perfectly true, for Voigt's references are not accompanied by adequate descriptions; and when Roxburgh, in whose *Flora Indica* a large proportion of the species are described, has been cited, the subsequent citation of Voigt is supererogatory. There is, however, a sense in which the verdict just quoted is inapplicable. The work, when employed as Voigt intended it to be, as a guide to the plants in cultivation in gardens in and about Calcutta, is not only the best, but, in the estimation of the native inhabitants of our districts, the only guide that is of the slightest use. This, however, is less because of any virtue in the arrangement or any merit in the scientific matter, than because the native names given are not only selected with much care and critical insight but are given in their original characters.

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[1] Calcutta: Bishop's College Press, 1845, 1 vol., large 8vo.

Perhaps the greatest defect in the work is that it goes too far and deals not only, as its title implies, with the plants cultivated in the two gardens at Calcutta and Serampore but includes, as Masters in his venture proposed, the indigenous plants as well. Its chief use is undoubtedly as a guide to the exotic plants cultivated in the neighbourhood of Calcutta; in this respect it still is, and will long continue to be, invaluable. As a guide to the non-exotic plants of the neighbourhood it is much less useful; indeed, as Hooker and Thomson say, it is not in this respect suitable as a work of reference.

In 1862 an attempt was made to utilise the information regarding the indigenous species enumerated in Voigt by R. Anderson in a *Catalogue of Plants indigenous in the neighbourhood of Calcutta with directions for the examination and preserving of plants.*[1] This compilation consists of a bare list of the plants given by Voigt as natives of Serampore with the names brought more or less up to date, but the list is badly printed and abounds with uncorrected printer's errors. Moreover, it does not give the vernacular names so carefully collected by Voigt, so that it is of no practical use except as a check list. The only valuable part of the pamphlet is the portion dealing with the examination and preservation of specimens which is taken from the introduction to the Colonial Floras published by the authority of Government. The number of natural families given is 86, of genera 327, of species 738.

In the present paper an attempt is made to do more thoroughly what was attempted by Anderson. It has not, however, appeared feasible to define the neighbourhood of Calcutta more rigidly than to consider this as including, to the east of the Hughli, the whole of the 24-Pergunnahs in which Calcutta lies, and on the west of the Hughli, the two districts of Howrah—where we have Shibpur and the Royal Botanical Garden, and Hughli—which includes Serampore. The list therefore enumerates all species hitherto collected within these three districts. But the district of the 24-Pergunnahs includes the Western Sundribuns where we have typical mangrove-swamp forests;

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[1] Calcutta: Bishop's College Press: 1862.

at the same time the most westerly sub-division (Goghat) of the Hughli district, lies beyond the Dwarkeswar river and outside the limits of the deltaic alluvium on which Calcutta is built, so that its flora is to a considerable extent that characteristic of drier districts like Bardwan and Birbhum. On either side of the river Hughli therefore we find, within the districts with which we have to deal, types of vegetation that are very distinctive, each including a number of species that are not to be met with in the immediate vicinity of Calcutta. But the actual number of species of each class, as compared with the total number of species in the list, is not very great and it is hardly worth while, for the sake of excluding them, to have recourse to the unnatural step of proposing arbitrary boundary lines for the 'neighbourhood' of Calcutta.

In drawing up the systematic list an enumeration has been made of all the flowering plants hitherto collected in our districts and of all the cryptogams, except the Fungi, of which named specimens are preserved in the Calcutta herbarium. It is, however, certain that, except as regards the Pteridophyta and Bryophyta, these cryptogamic lists are quite incomplete. As regards the Fungi, though the Calcutta material is fairly extensive, it has been so inadequately studied that a list of its named species would serve little useful purpose.

In the case of the Phanerogams all plants that are certainly wild in the districts are included. That a plant is wild in these districts is, however, no indication that it is indigenous. There is a sense in which, except perhaps in the Goghat sub-division of the Hughli district, no species *can* be indigenous in our area; the whole or nearly the whole tract consists of land laid down by the great river Ganges or its distributaries, and therefore all the plants growing on its surface *must* be immigrants from elsewhere. Even, however, if we admit this to be the case, the fact is not altered that a considerable number of species, some of which have certainly been originally deliberately introduced, (*Bryophyllum calycinum*, *Turnera ulmifolia*, *Opuntia Dillenii*, *Passiflora suberosa* are examples), though not even originally natives of India, are now absolutely established as *wild* plants in our area. But besides wild plants, whether native in the sense that they may have spread to these alluvial tracts from the adjacent higher ground of West Bengal or that they may have been brought by ocean currents, by rivers, by winds, or by living creatures other than man, the list includes all the crops cultivated in fields or gardens in the districts; and such trees or shrubs or herbs as are to be found in native gardens, or in village-shrubberies or by roadsides. Trees or shrubs or herbs that are only to be found in large public gardens or are only to be met with, as a rule, in the gardens of Europeans, are excluded except in the few cases, such as those of *Browallia elata, Hymenantherum tenuifolium, Torenia Fournieri*, and *Helianthus argyrophyllus* which habitually, or such as those of *Phlox Drummondi, Petunia nyctaginifolia*, and *Alyssum maritimum* which occasionally occur as self-sown plants in garden plots or in waste corners where the soil is good.

The question of showing whether a species is or is not wild, or whether it is or is not native, by the use of distinctive types in the systematic list, therefore appears neither to be practically useful nor to be altogether possible. All that it has appeared advisable to do has been to distinguish by means of an asterisk such species as may be certainly deemed *native* in the sense that (1) they are not cultivated plants; (2) they are thoroughly established plants; (3) they have been either introduced by other than human agency, or, if they have been introduced by man, the introduction has been inadvertent and they have been obviously introduced from some part of South-Eastern Asia. On the other hand, plants that are not distinguished by an asterisk, and among phanerogams these are about as numerous as plants of the preceding class, include species that cannot be certainly deemed native, because (1) they are only to be found in cultivation; (2) they are weeds that only occur associated with *cold-weather* crops, and that do not re-appear unless their seeds are re-sown with these crops; (3) they are plants that, even if now spontaneous, have clearly been originally purposely introduced by man, or, if their original introduction was inadvertent, have as their natural habitat some country other than India, Indo-China or Malaya. With this class are necessarily included such species as have been recorded from our area by previous botanical writers, such as Roxburgh, Wallich, Griffith, and Voigt, but which have not been met with in recent years. The omission of the distinguishing asterisk, it is hardly necessary to remark, does not imply doubt as to the accuracy of the record; when there is a doubt as to this, the fact is mentioned in the text. The probability is that, in most instances, the old records which have not been repeated are records of species which have appeared only as casuals in our area. A considerable number of recent records belong obviously to the same class; these are similarly shown in the subjoined list without an asterisk.

As one of the uses to which it is hoped those who may employ it will put the present list, is the verification of some at least of these former records the entries of all the species in the *Hortus Suburbanus Calcuttensis* have been cited. At the same time, with a view to assisting those who may employ the list in identifying the various species, references are also given to the writer's work entitled *Bengal Plants* in which will be found definitions of all the natural families and genera, accompanied by a series of keys to the great majority of the genera and species here enumerated. If in any case further reference is required to full specific descriptions or to figures, the necessary information will be found either in Roxburgh's *Flora Indica* to which both the *Hortus Suburbanus* and *Bengal Plants* will guide the student; or in Hooker's *Flora of British India* and Beddome's *Ferns of India and Ceylon,* to which references are made in *Bengal Plants.*

The present list deals with 120 natural families of phanerogams including 670 genera and 1,316 species. Of these 1,316 species about 120 are staple field or garden crops; 260 are plants that for one reason or another have been deliberately introduced, and 21 are species that have been certainly, though inadvertently, introduced by human agency. The remaining species may be considered native in a qualified sense; they include about 700 species fairly widely spread in South-Eastern Asia; 30 that are only to be found in the extreme north-west portion of our area (the Goghat sub-division of Hughli); 85 that are either confined to the Sundribuns or only extend a little way north from the Sundribuns into the Gangetic delta; and about 100 that extend from the northern part of our area into the Sundribuns.

The cryptogamic portion of the list deals with 37 natural families, including 92 genera and 175 species.

II.—TOPOGRAPHY AND VEGETATION.

The whole of the area included in the three districts around Calcutta is, in appearance and almost in reality, a level plain, though there is, as a matter of fact, a very gentle and gradual rise from the Sundribuns sea-face in the south-east of the 24-Pergunnahs to Goghat in the north-west of Hughli, and about Badanganj—the extreme western portion of the Goghat sub-division—a slight amount of natura undulation in the ground is perceptible. Except this Goghat sub-division, which lies west of the Dwarkeswar river and as already explained belongs really to West Bengal, the rest of the Hughli district and the whole of the Howrah district belong to the rice swamp of Central

Bengal. The same is true of a considerable portion of the 24-Pergunnahs from the river Hughli eastward and southward to a line running roughly from Mud Point north-westward to Basirhât. The large irregularly triangular slice of territory bounded on the west by the Hughli from Saugor light-house to Mud Point and from Mud Point to Basirhât by the arbitrary line just mentioned, on the east by the Raimangal river, and on the south by Bay of Bengal, which completes our area, forms the western portion of the Sundribuns.

The Hughli-Howrah districts, with the exception of the Goghat sub-division west of the Dwarkeswar, and the non-Sundribun portion of the 24-Pergunnahs may be taken together. They form part of Central Bengal and are typically representative of the great alluvial rice-plain of the Gangetic delta. The only natural high ground is along the banks of the main streams, and the only other high lands met with are the more or less artificial patches around villages and towns and the obvious mounds and embankments thrown up around ponds and along canals, or as means of communication by road or rail.

The greater portion of the area is under cultivation, all the low land being under rice-cultivation. Along the banks of the chief waterways where these are under tidal influence, we find a narrow hedge, or scattered patches of species that are characteristic of the Sundribun region, while on the mounds or embankments that have been artificially raised, and in the immediate vicinity of most villages and towns, we find groves and thickets of trees and shrubs, many of them subspontaneous only, a large proportion of them more or less economically useful, and a considerable number of them natives of countries other than India.

There is nothing that could possibly be termed genuine forest in the whole of this area, though in the north-eastern corner of Hughli in the Balagarh thana there is a certain amount of jungle including genuine forest trees as apart from the trees more characteristic of village and suburban shrubberies. Along the Damodar river there extends to the west a narrow strip, five or six miles wide, which is heavily flooded during every rainy season and is mostly uncultivated. This tract, which begins two or three miles west of the river bank,—for a narrow band along the western bank of the Damodar is highly cultivated during the cold weather—is under coarse grass and is practically uninhabited. In a few localities, where places formerly inhabited have been abandoned, as for instance, on the site of Satgaon, a little jungle, approaching to a true forest in character and appearance, may be met with.

The Goghat sub-division which, as has been explained, belongs to Western rather than Central Bengal, is as closely cultivated as the main portion of our area. The village-shrubberies are, however, less extensive and the species characteristic of roadsides and such waste places as exist include not a few that are unknown elsewhere in our area; *Cissampelos Pareira, Polycarpæa corymbosa, Salomonia oblongifolia, Ventilago maderaspatana, Desmodium heterophyllum, Cassia Absus, Drosera Burmanni, Wendlandia exserta, Morinda citrifolia, Cyathocline lyrata, Gnaphalium pulvinatum, Holarrhena antidysenterica, Mitrasacme alsinoides, Heliotropium ovalifolium, Striga lutea, Striga euphrasioides, Gmelina arborea, Moschosma polystachyum, Leucas mollissima, Commelina attenuata, Juncus prismatocarpus, Courtoisia cyperoides, Fimbristylis argentea, Panicum psilopodium, Digitaria pedicellaris, Tragus racemosus, Andropogon brevifolius, A. pertusus, Iseilema laxum, Aristida Adscencionis, Polypogon monspeliensis, Arundinella Wallichii, Eragrostis coarctata, Chloris virgata*; also as cultivated species, *Papaver somniferum, Guizotia abyssinica* and *Hordeum vulgare* exhaust the list of species that are only known from Goghat.

It has, however, to be remarked that a very considerable number of species which are only certainly known to the writer to occur, within our area, in Goghat west of the Dwarkeswar river have been reported from Serampore by Voigt. We know, however, from various passages in Voigt's *Hortus* that some at least of the plants he records were obtained, not by Voigt but by native collectors sent out by Carey or by himself, and it is, therefore, not improbable that these collectors in their search for additional species at times visited the corresponding country further south. This is rendered still more probable from the fact that Voigt's Serampore list includes not a few plants that have not been obtained even in Goghat and that we know to be strangers to or only casuals in the Gangetic delta.

A very noticeable feature in the list of these western, dry country species from Goghat is the number of species of grasses to be found there that do not grow on the mud of the delta. The vegetation of Goghat is in fact that characteristic of South Behar or Western Bengal, with which it is proposed to deal in a subsequent paper, and is quite different from that of the Delta.

The Western Sundribuns, or the swamp forest region of the 24-Pergunnahs, is covered throughout with a rather low forest for the most part unbroken, though here and there patches covered with tall grasses are interspersed, and towards the sea-face there occur at intervals considerable stretches of muddy shore sparingly wooded with mangroves and occasionally with patches of salt-worts. At other times the sea-face ends in a line of sand hills with a true dune vegetation.

The plants characteristic of the mangrove belt, or of these sand-dunes do not extend into the central portion of our area; nor to any considerable extent do the species that are characteristic of the interior of the swamp forests. The species that throughout the Sundribun region are characteristic of the banks of creeks and rivers do, however, in a rather marked degree continue along the banks of many nullahs and along those of all the larger streams to the north and west of the Sundribun area. On this account while we have, especially to the west of the Hughli, a considerable number of species that are truly wild in our districts which are really characteristic of the drier western parts of India, we also have, especially to the east of the Hughli, a considerable number of species that are truly wild in our area which are really characteristic of the Sundribuns.

The majority of the Sundribun species, however, are peculiar and are confined to that region, and but for the accident that the district of the 24-Pergunnahs extends to the sea and so includes a portion of the Sundribuns, they would find no place in this list. The following list, corresponding to the similar list for Goghat, includes all the species that are confined to the Sundribun portion of our area: the Sundri itself, *Heritiera minor,* also *Hibiscus tortuosus, Brownlowia lanceolata, Amoora cucullata, Carapa obovata, Salacia prinoides, Canavalia lineata, Dalbergia spinosa* and *D. torta, Desmodium umbellatum, Cæsalpinia Nuga, Rhizophora mucronata* and *R. conjugata, Ceriops Roxburghiana, Kandelia Rheedei, Bruguiera gymnorhiza* and *B. parviflora, Lumnitzera racemosa, Barringtonia racemosa, Sonneratia acida, Sesuvium Portulacastrum, Pluchea indica, Launea pinnatifida, Ægialitis rotundifolia, Ægiceras majus, Cerbera Odollam, Parsonsia spiralis, Finlaysonia obovata, Sarcolobus globosus* and *S. carinatus, Merremia convolulacea, Ipomœa Pes-capræ, Solanum trilobatum, Acanthus volubilis, Avicennia officinalis, Suæda maritima, Arthrocnemum indicum, Salicornia brachiata, Sapium indicum, Nipa fruticans, Phœnix paludosa, Calamus tenuis, Mariscus albescens, Elæocharis spiralis, Fimbristylis halophila* and *F. subbispicata, Scirpus trigueter* and *S. littoralis, Oryza coarctata, Myriostachya Wightiana, Nephrodium aridum.* There are also a few species that are only wild in our area because they occur as epiphytes on trees in the Western Sundribun forests, such as *Hoya parasitica, Dendrobium anceps* and *D. Pierardi, Luisia brachystachys, Sarcanthus insectifer, Polypodium* *adnascens* and *Vittaria elongata*. These, however, are in no way distinctive of the Sundribuns; their presence is due to the fact that it is only in the Sundribun part of our area that the forest conditions suitable for their growth are really to be found. A full account of the Sundribun flora will be found in Vol. II of these Records.

The rest of the species included in the list belong to four distinct groups:—(1) Species that are common to the Gangetic delta north of the Sundribuns and to the Sundribuns; (2) Species that are common to the Gangetic delta and Western Bengal, but that do not go into the Sundribuns; (3) Species that are neither to be found in the Sundribun forests nor in Western Bengal or beyond; and (4) a residuum of species that are cultivated or are manifestly introduced plants.

The species of the first group include plants that have either been left behind as the conditions of our districts became altered from their former swamp forest state, or that have, under the influence of the tides which affect the various rivers and creeks, invaded our area from the Sundribuns. They, however, include a few that on the other hand have obviously invaded the Sundribuns from the north; these in some cases at least are common to Western Bengal and to the deltaic area. Taking first the plants of this latter sub-group we find that they include *Naravelia zeylanica*, *Cratæva religiosa*, *Capparis sepiaria*, *Flacourtia sepiaria*, *Tamarix gallica*, *Vitis quadrangularis*, *Vitis trifolia*, *Allophylus Cobbe*, *Odina Wodier*, *Crotalaria Saltiana*, *C. retusa* and *C. verrucosa*, *Derris scandens*, *Flemingia congesta*, *Cæsalpinia Bonducella*, *Cassia Fistula* and *C. Sophera*, *Acacia tomentosa* and *A. concinna*, *Barringtonia acutangula*, *Zehneria umbellata*, *Randia dumetorum*, *Vangueria spinosa*, *Ixora parviflora*, *Wedelia calendulacea*, *Diospyros Embryopteris*, *Hemidesmus indicus*, *Calotropis gigantea*, *Dregea volubilis*, *Cordia Myxa*, *Ipomæa paniculata*, *Ipomæa sepiaria*, *Cuscuta reflexa*, *Hygrophila phlomoides*, *Lippia nodiflora*, *Vitex trifolia* and *V. Negundo* *Clerodendron Siphonanthus*, *Alternanthera sessilis*, *Aristolochia indica*, *Cassytha filiformis*, *Loranthus Scurrula*, *L. longiflorus* and *L globosus*, *Viscum monoicum*, *Bridelia stipularis*, *Breynia rhamnoides*, *Croton oblongifolius* and *C. caudatus*, *Mallotus repandus*, *Streblus asper*, *Ficus retusa*, *Saccolabium papillosum*, *Aneilema nudiflorum*, *Pandanus fœtidus*, *Typha elephantina* and *T. angustata*, *Cryptocoryne ciliata*, *Juncellus inundatus*, *Cyperus malaccensis* and *C. exaltatus*, *Fimbristylis ferruginea*, *Scirpus grossus* and *S. articulatus*, *Panicum repens*, *Oryza sativa*, *Saccharum spontaneum*, *Sporobolus tremulus*, *Phragmites Karka*, *Ceratopteris thalictroides*, *Polypodium quercifolium*, *P. adnascens* and *P. irioides*. The species in this list are exclusively plants that have extended into the Sundribuns and are established in the swamp-forests or at the sea-face. One or two of the species, such as *Cordia Myxa* and *Diospyros Embryopteris* may be plants that were originally deliberately introduced and that have persisted in abandoned clearings; all are, however, truly wild species in the Sundribun region. The species that occur as weeds or cultivated plants in existing Sundribun clearings are here dealt with along with the other species of the Lower Gangetic plain.

The species that extend northward into the Central Bengal rice-plain from the Sundribuns, especially along river banks, are less numerous. They include *Hibiscus tiliaceus*, *Thespesia populnea*, *Aphania Danura*, *Erythrina indica*, *Canavalia turgida*, *Phaseolus adenanthus*, *Vigna luteola*, *Pongamia glabra*, *Derris uliginosa*, *Sonneratia apetala*, *Morinda bracteata*, *Blumea amplectens*, *Sphæranthus africanus*, *Wedelia scandens*, *Azima tetracantha*, *Pentatropis microphylla*, *Tylophora tenuis*, *Stictocardia tiliæfolia*, *Acanthus ilicifolius*, *Premna integrifolia*, *Clerodendron inerme*, *Psilotrichum ferrugineum*, *Agyneia bacciformis*, *Trewia nudiflora*, *Excoecaria Agallocha*, *Ficus Rumphii*, *Crinum asiaticum*, *Alpinia Allughas*, *Flagellaria indica*, *Pandanus fascicularis*, *Ruppia rostellata*, *Pycreus polystachyus*, *Cyperus scariosus*, *Scirpus triqueter* var., *Paspalum distichum*, *Zoysia pungens*, *Acrostichum palustre and A. aureum*.

Turning now to the species that are common to Northern Bengal or to Western Bengal, of which the somewhat outlying Goghat sub-division of the Hughli district is an integral portion, or to the drier parts of India further west still, and to the deltaic alluvial portion of our area, but that do not enter the Sundribuns though in many cases they extend eastward to Indo-China and Malaya, we find that we have to deal with a considerable list, though it may be remarked that a remarkable proportion of these are species recorded as occurring near Serampore or Calcutta by Roxburgh, Carey, and Voigt, but not seen from our districts, except from Goghat, and by no means in all cases from that sub-division, since 1845. For this there are two possible explanations. In some cases it is certain that Voigt's "Serampore" plants were brought in by native collectors who probably went sufficiently far west in their journeys to reach the drier, and though still practically level, yet non-alluvial tract just south of Goghat. In other cases the species were collected at or near Serampore, not impossibly even in Dr. Carey's garden, but were only casuals in our area, accidentally sown with the seeds, or brought in the soil about the roots, of purposely introduced species. This remark applies equally to a very considerable number of species seen by the writer, some indeed of these being species not met with either by Roxburgh or by Voigt. In the list now given all species of the kind are marked with an asterisk. The list is as follows:—

**Nigella sativa*, *Ranunculus sceleratus*, *Cocculus villosus*, *Tinospora tomentosa* and *T. cordifolia*, *Tiliacora racemosa*, *Stephania hernandifolia*, *Fumaria parviflora*, *Nasturtium palustre* and *N. indicum*, **Cardamine debilis*, *Cochlearia flava*, **Capsella Bursa-Pastoris*, *Cleome viscosa*, *Gynandropsis pentaphylla*, *Capparis horrida* and **C. zeylanica*, *Ionidium suffruticosum*, *Flacourtia sapida*, *Polygala chinensis*, **Saponaria Vaccaria*, **Stellaria media*, **Spergula pentandra*, *Polycarpon Loeflingiæ*, *Portulaca oleracea* and *P. quadrifida*, *Tamarix dioica*, *Bergia verticillata* and *B. ammannioides*, *Sida veronicæfolia*, *S. acuta*, *S. cordifolia*, *S. rhombifolia* and *S. rhomboidea*, *Urena lobata* and *U. sinuata*, *Abutilon indicum* and *A. hirtum*, *Hibiscus ficulneus*, **H. tetraphyllus*, *H. vitifolius*, **H. panduriformis*, **H. hirtus* and **H. Abelmoschus*, *Bombax malabaricum*, *Helicteres Isora*, *Pentapetes phœnicea*, *Melochia corchorifolia*, *Waltheria indica*, **Grewia asiatica*, **G. polygama*, *G. lævigata*, **G. multiflora* and *G. hirsuta*, *Triumfetta rhomboidea*, *Corchorus acutangulus*, **C. fascicularis*, and **C. trilocularis*, **Hiptage Madablota*, *Tribulus cistoides* and *T. terrestris*, *Oxalis corniculata*, *Biophytum sensitivum*, **Acronychia laurifolia*, *Glycosmis pentaphylla*, *Clausena heptaphylla*, **Feronia elephantum*, *Ægle Marmelos*, **Garuga pinnata*, **Melia Azadirachta*, **Amoora Rohituka*, *Cedrela Toona*, **Olax phœnicarpa*, *Zizyphus Œnoplia*, **Gouania leptostachya*, *Vitis latifolia*, *V. adnata*, **V. lanata*, *V. repanda*, **V. indica*, *V. pedata* and **V. elongata*, *Leea macrophylla*, *L. crispa*, *L. robusta*, *L. aequata* and *L. sambucina*, *Cardiospermum Halicacabum*, **Erioglossum edule*, *Vicia hirsuta*, **Lathyrus Aphaca*, *Abrus precatorius*, **Crotalaria quinquefolia*, **C. laburnifolia*, **C. medicaginea*, **C. alata*, **C. sericea*, *C. mysorensis*, **C. calycina*, *C. prostrata* and *C. acicularis*, *Cylista scariosa*, *Rhynchosia rufescens*, *R. viscosa*, *R. sericea*, *Atylosia scarabæoides*, *Phaseolus trilobus* and *P. sublobatus*, *Vigna pilosa*, *Teramnus labialis* and *T. debilis*, *Canavalia virosa*, *Mucuna pruriens*, **Butea frondosa*, *Sesbania aculeata* and *S.. uliginosa*, *Tephrosia Hookeriana* and *T. purpurea*, *_Dalbergia Sissoo_, *_D. lanceolaria_ and *_D. latifolia_, _Melilotus indica_ and *_M. alba_, *_Trigonella corniculata_, _Smithia sensitiva_, _Uraria picta_ and _U. lagopoides_, *_Lourea vespertilionis_, _Desmodium triflorum_, _D. diffusum_, *_D. pulchellum_, _D. Cephalotes_, _D. polycarpum_, _D. gangeticum_ and _D. gyrans_, _Alysicarpus vaginalis_, _A. bupleurifolius_ and _A. rugosus_, _Psoralea corylifolia_, _Indigofera linifolia_, _I. trifoliata_, _I. viscosa_ and *_I. trita_, *_Cassia auriculata_, _C. Tora_, and *_C. mimosoides_, *_Bauhinia racemosa_, *_Cæsalpinia Sappan_ and *_C. sepiaria_, _Mimosa rubricaulis_, _Acacia Suma_, _A. catechuoides_, *_A. Farnesiana_ and *_A. arabica_, _Kalanchoe laciniata_, *_Eugenia caryophyllifolia_. _Ammannia rotundifolia_, _A. peploides_, _A. pygmæa_, _A. pentandra_, _A. baccifera_, and _A. multiflora_, *_Woodfordia floribunda_, _Jussiaea suffruticosa_, _Ludwigia parviflora_, _Trichosanthes cucumerina_ and _T. palmata_, _Gymnopetalum cochinchinense_, _Luffa graveolens_, and _L. amara_, _Momordica dioica_ and _M. cochinchinensis_, _Cucumis trigonus_, _Cephalandra indica_, _Mukia scabrella_, _Bryonia laciniosa_, _Trianthema monogynum_, _Mollugo stricta_, _M. Spergula_, and _M. hirta_, _Hydrocotyle rotundifolia_ and _H. asiatica_, _Œnanthe stolonifera_ and _Œ. benghalensis_, _Seseli indicum_, _Alangium Lamarckii_, *_Adina cordifolia_, _Stephegyne parvifolia_, _Dentella repens_, _Oldenlandia crystallina_, _O. diffusa_, _O. corymbosa_, and _O. paniculata_, *_Randia uliginosa_, _Hyptianthera stricta_, _Pavetta indica_, *_Coffea bengalensis_, _Ixora undulata_, _Pæderia fœtida_, *_Knoxia corymbosa_, _Spermacoca hispida_, *_Centratherum anthelminticum_, _Vernonia cinerea_, _Elephantopus scaber_, _Adenostemma viscosum_, _Grangea maderaspatana_, _Blumea bifoliata_, _B. Wightiana_, _B. glomerata_, _B. lacera_, _B. laciniata_ and _B. membranacea_, _Laggera flava_ and _L. aurita_, _Sphæranthus indicus_, _Athroisma laciniatum_, _Gnaphalium luteo-album_ and _G. indicum_, _Cæsulia axillaris_, _Emilia sonchifolia_, _Xanthium strumarium_, _Eclipta alba_, *_Spilanthes Acmella_, *_Galinsoga parviflora_, _Cotula hemispherica_, _Centipeda orbicularis_, _Cnicus arvensis_, _Crepis japonica_ and _C. acaulis_, _Sonchus asper_, *_S. oleraceus_ and *_S. arvensis_, _Launea asplenifolia_, *_Lobelia trigona_, _Sphenoclea zeylanica_, _Wahlenbergia gracilis_, _Stylidium tenellum_, *_Androsace saxifragæfolia_, *_Anagallis arvensis_, _Ardisia humilis_, _Diospyros cordifolia_, _Jasminum pubescens_ and *_J. elongatum_, *_Carissa spinarum_, _Rauwolfia serpentina_, *_Alstonia scholaris_, _Vallaris Heynei_, _Ichnocarpus frutescens_, _Cryptolepis Buchanani_, _Oxystelma esculentum_, _Calotropis gigantea_, _Cynanchum Callialata_, _Dæmia extensa_, *_Sarcostemma brevistigma_, _Gymnema hirsutum_, _Pergularia pallida_ and *_P. minor_, _Tylophora asthmatica_, _Exacum_ *tetragonum* and *E. pedunculatum, Erythræa Roxburghii, Hoppea dichotoma, Canscora diffusa* and *C. decussata, *Enicostema littorale, Hydrolea zeylanica, *Ehretia lævis, Heliotropium strigosum* and *H. indicum, Coldenia procumbens, Cynoglossum lanceolatum, Trichodesma indicum* and **T. zeylanicum, *Cuscuta chinensis, *C. capitata* and **C. europæa, Evolvulus alsinoides, *Hewittia bicolor, Merremia vitifolia, *Merremia tridentata, *M. hastata,* and *M. emarginata, *Ipomœa hispida, I. Pes-tigridis,* and *I. obscura, Calonyction Bona-nox, *Rivea hypocrateriformis, Argyreia speciosa* and *A. argentea, Lettsomia strigosa, Solanum verbascifolium, S. nigrum, S. ferox, S. torvum, S. indicum* and *S. xanthocarpum, Physalis minima, *Withania somnifera, Celsia coromandeliana, Linaria ramosissima Mazus rugosus, Lindenbergia urticifolia, *Limnophila Roxburghii, L. conferta, L. diffusa, L. heterophylla, L. gratissima, L. racemosa* and *L. gratioloides, Herpestis Monniera* and **H. Hamiltoniana, Dopatrium junceum, *Torenia cordifolia* and **T. asiatica, Vandellia crustacea, V. multiflora, V. pedunculata, V. angustifolia,* and *V. pyxidaria, Ilysanthes parviflora. *I. hyssopoides* and *I. rotundifolia, Bonnaya brachiata, B. veronicæfolia, B. tenuifolia* and **B. oppositifolia, *Veronica Anagallis* and *V. agrestis, Centranthera hispida* and *C. humifusa, *Æginetia pedunculata Orobanche indica, *Utricularia racemosa* and *U. bifida, *Thunbergia grandiflora, Nelsonia campestris, Ebermaiera glutinosa, Cardanthera triflora, Hygrophila polysperma, H. quadrivalvis* and *H. spinosa, Ruellia prostrata, Hemigraphis hirta, Phaylopsis parviflora, Andrographis paniculata, *Barleria Prionitis* and *B. cristata, Asystasia gangetica, Ecbolium Linneanum, Justicia Gendarussa, J. quinqueangularis* and *J. simplex, Adhatoda Vasica, Peristrophe bicalyculata, Rungia parviflora, Dicliptera Roxburghiana, Verbena officinalis, Callicarpa macrophylla* and *C. longifolia, Clerodendron infortunatum, *Ocimum adscendens, Pogostemon plectranthoides, Dysophylla verticillata, Anisomeles ovata, *Leonurus sibiricus, Leucas aspera, L. linifolia, L. Cephalotes* and *L. procumbens, *Leonotis nepetifolia, Salvia plebeja, Boerhaavia repens, *Pisonia aculeata, Deeringia celosioides, Digera arvensis, Amarantus spinosus, A mangostanus, A. fasciatus, A. viridis, A. polygamus* and *A. tenuifolius, *Pupalia atropurpurea, Ærua lanata* and **Æ. scandens, Achyranthes aspera, Chenopodium album, Polygonum plebejum, *P. lapathifolium, *P. tomentosum, *P. lanigerum, P. barbatum, P. orientale, P. glabrum, P. serrulatum, P. Hydropiper,* and *P. flaccidum, Rumex maritimus* and *R. dentatus, *Piper longum, Litsæa sebifera* and *L. polyantha,* *_Euphorbia antiquorum_, *_E. neriifolia_, *_E. Nivulia_, _E. dracunculoides_, _E. hypericifolia_, _E. pilulifera_, _E. thymifolia_ and _E. microphylla_, _Bridelia tomentosa_, *_Glochidion multiloculare_, _Flueggea microcarpa_, _Phyllanthus reticulatus_, *_P. maderaspatensis_, _P. Urinaria_, _P. Niruri_, and _P. simplex_, _Antidesma Ghæsembhilla_ and _A. diandrum_, _Chrozophora plicata_, _Gelonium multiflorum_ and *_G. lanceolatum_, _Baliospermum axillare_, _Acalypha indica_ and _A. ciliata_, _Tragia involucrata_ and *_T. cannabina_, _Trema orientalis_, _Fleurya interrupta_, _Pouzolzia indica_, _Ficus bengalensis_, _F. relegiosa_, _F. infectoria_, _F. hispida_ and _F. glomerata_, _Pachystoma senile_, _Eulophia graminea_, _Geodorum dilatatum_ and *_G. purpureum_, _Vanda Roxburghii_,*_Cleisostoma micranthum_, _Didymoplexis pallens_, _Pogonia plicata_, _P. juliana_ and _P. carinata_, _Zeuxina sulcata_, _Habenaria digitata_, *_H. commelinifolia_, _H. marginata_ and _H. viridiflora_, *_Hedychium coronarium_, _Curcuma aromatica_, *_C. cæsia_, _C. ferruginea_ and _C. rubescens_, _Costus speciosus_, _Curculigo orchioides_, _Crinum defixum_ and _C. pratense_, _Dioscorea pentaphylla_, _D. bulbifera_, _D. spinosa_, _D. anguina_ and _D. glabra_, _Asparagus racemosus_, _Smilax prolifera_ and *_S. macrophylla_, _Gloriosa superba_, *_Asphodelus tenuifolius_, _Monochoria hastæfolia_ and _M. vaginalis_, _Xyris pauciflora_, _Commelina nudiflora_, _C. salicifolia_, _C. Hasskarlii_, _C. bengalensis_, _C. obliqua_ and _C. suffruticosa_, _Aneilema spiratum_ and _A. vaginatum_, *_Cyanotis cristata_ and _C. axillaris_, _Calamus viminalis_, _Typhonium trilobatum_, _T. cuspidatum_ and *_T. divaricatum_, _Amorphophallus bulbifer_, _Plesmonium margaritiferum_, _Alocasia fornicata_, _Colocasia nymphaeifolia_, _Scindapsus officinalis_, _Lasia heterophylla_, _Alisma reniforme_ and _A. oligococcum_, _Limnophyton obtusifolium_, _Sagittaria sagittifolia_ and _S. guayanensis_, _Butomopsis lanceolata_, _Eriocaulon truncatum_, _E. Sieboldianum_, _E. luzulifolium_, _E. quinqueangulare_ and _E. trilobum_, _Scleria biflora_ and _S. lithosperma_, _Kyllinga monocephala_, _K. brevifolia_ and _K. triceps_, _Pycreus sanguinolentus_ and _P. nitens_, _Juncellus pygmæus_, _Cyperus cuspidatus_, *_C. castaneus_, _C. flavidus_, _C. difformis_, _C. Haspan_, _C. niveus_, _C. compressus_, _C. aristatus_, _C. Iria_, _C. pilosus_, _C. procerus_, _C. distans_, _C. nutans_, _C. articulatus_, _C. tegetiformis_, _C. corymbosus_, *_C. tegetum_, _C. rotundus_, _C. tuberosus_, _C. radiatus_ and *_C. platyphyllus_, _Mariscus Dregeanus_, _M. squarrosus_, _M. paniceus_, _M. Sieberianus_ and _M. microcephalus_, _Eleocharis plantaginea_, _E. fistulosa_, _E. capitata_ and _E. palustris_, _Fimbristylis monostachya_, _F. acuminata_, _F. schœnoides_, _F. squarrosa_, _F. dichotoma_, _F. diphylla_, _F. æstivalis_, _F. tenera_, _F. globulosa_, _F. quinqueangularis_, _F. miliacea_ and _F. complanata_, _Echinolytrum_ *dipsaceum*, *Bulbostylis barbata*, *Lipocarpha argentea*, *Fuirena glomerata*, *Scirpus Michelianus*, *S. squarrosus*, *S. supinus*, **S. Isolepis*, *S. erectus* and *S. mucronatus*, **Pennisetum setosum*, *Setaria glauca*, *S. intermedia* and *S. verticillata*, **Isachne miliacea* *Oplismenus compositus* and *O. Burmanni*, *Axonopus cimicinus*, *Panicum flavidum*, *P. punctatum*, *P. Crus-Galli*, *P. stagninum*, *P. colonum*, *P. prostratum*, *P. javanicum*. *P. setigerum*, *P. distachyum*, *P. Kurzii*, *P. myosuroides*, *P. indicum*, *P. trypheron*, *P. humile* and **P. trigonum*, *Digitaria sanguinalis*, *D. tenuiflora* and *D. puberula*, *Paspalum scrobiculatum*, *Eriochloa polystachya*, *Perotis latifolia*, **Dimeria ornithopoda*, *Imperata arundinacea*, **Saccharum arundinaceum*, *Pollinia argentea*, *Manisuris granularis*, *Rottboellia compressa*, *R. protensa* and *R. exaltata*, *Mnesithea lævis*, *Apluda varia*, **Ischæmum aristatum*, *I. rugosum*, **I. semisagittatum*, **I. conjugatum* and **I. ciliare*, **Arthraxon microphyllus*, *Andropogon intermedius*, **A. halepensis*, **A. squarrosus*, *A. aciculatus*, **A. contortus*, *A. caricosus* and *A. annulatus*, **Pseudanthistiria heteroclita*, **Anthistiria ciliata* and **A. gigantea*, *Polytoca barbata*, *Coix Lachryma-Jobi* and **C. gigantea*. *Sporobolus diander* and *S. tremulus*, *Arundo Donax*, **Eragrostis aspera*, *E. tenella*, *E. interrupta*, *E. amabilis*, *E. gangetica*, *E. stenophylla*, *E. major*, *E. minor*, *E. tremula*, *E. pilosa* and *E. cynosuroides*, **Diplachne fusca*, *Leptochloa filiformis* and *L. chinensis*, *Microchloa setacea*, *Cynodon dactylon*, *Chloris barbata*, *Eleusine indica* and *E. ægyptiaca*, **Davallia multiflora*, *Adiantum lunulatum* and **A. caudatum*, *Pteris longifolia*, *Neprodium unitum* and *N. molle*, **Nephrolepis cordifolia*, *Polypodium proliferum*, **Drymoglossum piloselloides*, *Hemionitis arifolia*, **Lygodium flexuosum* and *L. japonicum*, *Ophioglossum reticulatum*, *Helminthostachys zeylanica*, *Marsilea quadrifoliata* and *M. minuta*, **Lycopodium Phlegmaria*, *Selaginella proniflora*, *Fissidens bengalensis*, *Calymperes tenerum*, *Barbula orientalis* and *B. gangetica*, *Splachnobryum indicum*, *Physcomitrium cyathocarpum*, *Cyathodium albonitens*, and possibly *Athalamia pinguis*.

In the foregoing list are included all the species of drier places that occur in Northern or Western Bengal or in parts of India further west than West Bengal even when the species has not yet been collected there. But besides these all the species of rice-fields and marshy places which have an erect habit are also enumerated. There are, however, a number of the submerged or floating aquatic plants so characteristic of our area that also occur in rice-fields, ponds and marshes throughout the regions to the west or north of our districts.

These it seems more satisfactory to enumerate separately; they are therefore given in the following list:—*Nymphæa Lotus*, *N. rubra* and *N. stellata* *Nelumbium speciosum*. *Hydrocera triflora*, *Æschynomena indica* and *Æ. aspera*, *Neptunia oleracea*, *Aldrovanda vesiculosa*. *Myriophyllum tuberculatum* and *M. indicum*, *Jussiaea repens*, *Trapa bispinosa*, *Enhydra fluctuans*, *Limnanthemum cristatum* and *L. indicum*, *Ipomæa reptans*, *Utricularia stellaris*, *U. flexuosa*, *U. exoleta* and **U. reticulata*, *Ceratophyllum demersum* *Hydrilla verticillata*. *Lagarosiphon Roxburghii*, *Vallisneria spiralis*, *Blyxa Roxburghii*, *Hydrocharis cellulosa*, *Ottelia alismoides*, *Pistia Stratiotes*, *Cryptocoryne spiralis* *Lemna paucicostata*, *L. trisulca*, *L. polyrrhiza* and *L. oligorrhiza*, *Wolffia arrhiza* and *W. microscopica*, *Aponogeton monostachya*, *A. echinatum* and *A. crispum*, *Potomogeton indicus*, *P. crispus* and *P. pectinatus*, *Najas indica*, *N. minor*, *N. foveolata* and *N. graminea*, *Eriocaulon Capillus-naiadis*, *Cyperus Cephalotes*, *Chamæraphis spinescens* *Panicum Myurus*, *P. interruptum* and *P. proliferum*, *Leersia hexandra*, *Hygrorhiza aristata*, *Coix aquatica*, *Salvinia cucullata*, *Azolla pinnata* *Isoëtes coromandeliana*.

The species that are not to be found to the west of the Gangetic plain are strikingly few in number. Of those that are either plants of dry places or, if they occur in or near ponds or marshes, are erect we find the following:—*Brassica agrestis*, **Spondias mangifera*, *Rhynchosia bracteata*, **Erythrina ovalifolia*, *Sesbania paludosa*, *Ammannia salicifolia*, *Blumea amplectens*, *Bothriospermum tenellum*, *Cressa cretica*, *Merremia chryseides*, *Operculina Turpethum*, *Limnophila erecta*, *Lantana indica*, *Lippia geminata*. *Litsæa salicifolia*, *Acalypha fallax*, *Pilea microphylla*, *Ficus heterophylla*, *Commelina appendiculata*, *Typhonium Schottii*, * *Alocasia cucullata*, * *Cyperus digitatus*, *Mariscus ferax*, *Scirpus affinis*, * *Saccharum fuscum*, *Pollinia conjugata*. The only floating or submerged aquatic species which do not extend westward from our districts are *Euryale ferox* and *Chamæraphis spinescens*.

In considering the residual species it is most convenient to deal separately with the staple crops grown in the districts; with the species that are systematically planted or that have been purposely introduced for various reasons; and finally with the species that have been accidentally or inadvertently introduced.

The crops cultivated are largely Indian, though a fair proportion are originally of foreign origin. They include *Brassica juncea*, Rai, probably originally Chinese, *Brassica Rapa*, the Turnip, probably originally Central Asiatic; *Brassica Sarson*, the Indian Colza, probably originally Indian; *Brassica dichotoma,* Indian Rape, probably originally Central Asian; *Brassica oleracea,* the Cabbage, originally Mediterranean; *Eruca sativa,* possibly originally Central Asian; *Lepidium sativum,* originally Mediterranean; *Raphanus sativus,* the Radish, originally Central Asian; *Hibiscus cannabinus,* native; *Hibiscus Sabdariffa,* originally African; *Gossypium herbaceum,* native; *Abroma augusta,* Indo-Chinese; *Corchorus olitorius,* Jute, native; *Corchorus capsularis,* Jute, Chinese; *Linum usitatissimum,* Flax, Mediterranean; *Cicer arietinum,* Chick-pea, Mediterranean; *Vicia sativa,* Tare, Mediterranean; *Lens esculenta,* Lentil, Mediterranean; *Lathyrus sativus,* Vetch, Mediterranean; *Pisum sativum,* Pea, Mediterranean; *Pisum arvense,* Field Pea, Western Asiatic; *Crotalaria juncea,* Sunn, native; *Cajanus indicus,* Pigeon Pea, African; *Phaseolus lunatus,* Lima Bean, S. American; *Phaseolus vulgaris,* French Bean, Mediterranean; *Phaseolus multiflorus,* Scarlet Runner, American; *Phaseolus Mungo,* native; *Phaseolus radiatus,* native; *Vigna Catjang,* Chinese; *Pachyrhizus angulatus,* American; *Dolichos Lablab,* African; *Dolichos biflorus,* native; *Psophocarpus tetragonolobus,* American; *Canavalia ensiformis,* native; *Mucuna utilis,* African; *Mucuna nivea,* native; *Sesbania cannabina,* native *Arachis hypogæa,* American; *Trigonella Fœnum-græcum,* Mediterranean; *Cyamopsis psoraloides,* African; *Trichosanthes dioica,* native; *Trichosanthes anguina,* native; *Lagenaria vulgaris,* native; *Luffa ægyptiaca,* African; *Luffa acutangula,* native; *Benincasa cerifera,* native; *Momordica Charantia,* native; *M. muricata,* native; *Cucumis Melo,* Mediterranean, *Cucumis sativus,* Mediterranean; *Citrullus vulgaris,* Mediterranean; *Cucurbita Pepo,* Mediterranean; *Cucurbita maxima,* Mediterranean; *Cucurbita moschata,* Mediterranean; *Carum Roxburghianum,* native; *Carum copticum,* native; *Fœniculum vulgare,* Mediterranean; *Peucedanum Sowa,* native; *Coriandum sativum,* Mediterranean; *Daucus Carota,* Mediterranean; *Helianthus tuberosus,* S. American; *Chrysanthemum coronarium,* Chinese; *Lactuca sativa,* Mediterranean; *Carthamus tinctorius,* native; *Lycopersicum esculentum,* American; *Solanum tuberosum,* American; *Solanum Melongena,* native; *Capsicum annuum,* American; *Capsicum frutescens,* American; *Nicotiana rustica,* American; *Nicotiana Tabacum,* American; *Sesamum indicum,* Western Asiatic; *Amarantus gangeticus,* native; *Amarantus tristis,* native; *Amarantus Blitum,* native; *Beta vulgaris,* Central Asian; *Spinacea oleracea,* African; *Basella rubra,* native; *Rumex vesicarius,* African; *Piper Chaba,* Malayan; *Piper Betle,* Malayan; *Piper nigrum,* native; *Ricinus communis,* African; *Bœhmeria nivea,* Chinese; *Kæmpferia Galanga,* Malayan; *Kæmpferia* *rotunda*, Indo-Chinese; *Curcuma Zedoaria*, native; *Curcuma longa*, native; *Curcuma Amada*, native; *Zingiber Zerumbet*, Indo-Chinese; *Zingiber Casumunar*, native; *Zingiber officinale*, native; *Maranta arundinacea*, American; *Musa sapientum* native; *Sanseviera Roxburghiana*, doubtfully native; *S. trifasciata*, African; *Dioscorea fasciculata*, native; *Dioscorea alata*, native; *Allium Ascalonicum*, Mediterranean; *Allium Cepa*, Mediterranean; *Allium tuberosum*, native; *Allium Ampeloprasum*, Mediterranean; *Allium sativum*, Mediterranean; *Amorphophallus campanulatus*, native; *Alocasia indica*, native; *Alocasia macrorrhiza*, Indo-Chinese; *Colocasia antiquorum*, native; *Pennisetum typhoideum*, African; *Setaria italica*, Mediterranean; *Panicum miliaceum*, native; *Panicum miliare*, native; *Panicum maximum*, African; *Oryza sativa*, native; *Saccharum Sara*, native; *Saccharum officinarum*, native; *Andropogon Schœnanthus*, native; *Andropogon Nardus*, native; *Andropogon Sorghum*, native; *Eleusine Coracana*, native; *Triticum vulgare*, Central Asiatic; *Zea Mays*, American.

Of the crops grown in our districts about 50 are almost certainly natives of India itself, but of these four-fifths are crops of the monsoon season, only one-fifth are cold-weather crops. On the other hand, 35 crops or so are natives of Central or Western Asia or of the Mediterranean region; with hardly an exception these are crops of great antiquity in India and from the situation of their native countries it is almost certain that they were originally brought with them to India by early invaders from the north-west. In this case, with, perhaps, one or two exceptions, the crops are crops of the cold weather only. About 15 of our crops are of African origin and the majority of these are introductions of later date, many of them not going beyond the period of Mussalman invasions. A few of these African crops, however, like *Guizotia abyssinica*, are very interesting because their cultivation is as old as, or older than, that of the crops probably introduced by Aryan invaders, and because their use is practically confined to peoples of Central Indian affinity. Of these African crops two-thirds are monsoon crops. Crops introduced from America, and therefore mostly, if not wholly, introductions that date from the discovery of the New World, are almost as numerous as the African ones. In this case, however, two-thirds of the crops are cold season ones. Some of the American crops like the Potato, and various vegetables, have obviously been introduced by way of Europe. Others, however, like the Tobaccos, the Chillies and Maize would appear to have come by the Eastern route, and perhaps, by way of China and independent of, if not prior to, European intercourse with America. About a dozen crops have clearly come to India by eastern and north-eastern channels from Malaya, Indo-China or China. Of these, nearly one-half are Chinese and all of these are cold-weather crops, the rest from Indo-China or Malaya are crops of the rainy season.

Of the crops about 70 consist of vegetables of various kinds, half of these being rains' crops and half of them cold-weather ones. Of the remaining 50 crops, 12 are cereals, as many are pulses, 11 are fibre plants, 9 are oil-seed crops, the rest are food accessories, dyes, etc. Of the cereals three-fourths are rains' crops; of the pulses two-thirds are cold-weather crops; the fibre plants are almost all crops of the rainy season.

In considering the species that are not staple crops but that have nevertheless been purposely introduced or planted for various reasons we may most conveniently commence by considering those shrubs and trees that are natives of South-Eastern Asia or Polynesia. A very considerable number of these only occur as planted trees or shrubs—others, however, are frequently self-sown and still others are so thoroughly established that they may be looked on as naturalized in our area. These last in the following list are marked by an asterisk:—* *Dillenia indica*, *Michelia Champaca*, *Artabotrys odoratissimus*, *Cananga odorata*, *Polyalthia longifolia*, *P. cerasoides* and * *P. suberosa*, *Calophyllum inophyllum*, *Garcinia Xanthochymus*, *Hibiscus mutabilis*, *Eriodendron anfractuosum*, *Sterculia alata*, *S. colorata* and *S. fœtida*, *Kleinhovia Hospita*, *Pterospermum acerifolium*, * *Averrohoa Carambola* and **A. Bilimbi*, * *Murraya exotica* and *M. Kœnigii*, *Citrus decumana* and *C. medica*, *Elæodendron glaucum*, *Zizyphus Jujuba*, *Sapindus trifoliatus* and *S. Mukorossi*, *Nephelium Longana*, *Mangifera indica*, *Spondias dulcis*, *Moringa pterygosperma*, *Sesbania grandiflora*, *Cassia glauca* and *C. siamea*, * *Bauhinia acuminata*, *B. tomentosa*, *B. variegata* and * *B. purpurea*, * *Saraca indica*, *Cæsalpinia pulcherrima*, *Parkia biglandulosa*, *Albizzia Lebbek*, *A. procera* and *A. lucida*, *Rosa involucrata*, *Terminalia Catappa*, *Quisqualis indica*, *Eugenia malaccensis*, *E. javanica*, *E. Jambos*, *E. æquea*, and *E. Jambolana*, *Lagerstrœmia indica* and *L. Flos-Reginæ*, *Panax fruticosum*, * *Anthocephalus Cadamba*, *Ixora coccinea*, * *Canthium parvifolium*, * *Mimusops Elengi*, *Diospyros discolor*, *Jasminum auriculatum*, *Nyctanthes Arbor-tristis*, * *Carissa Carandas*, *Kopsia fruticosa*, * *Alstonia macrophylla*, * *Tabernæmontana coronaria*, *Wrightia coccinea*, *Vallaris Pergulana*, *Beaumontia grandiflora*, *Porana paniculata*, *Ipomœa Nil*, *Ipomœa Learii*, *Ipomœa pulchella*, * *Oroxylum indicum*, * *Millingtonia hortensis*, * *Callicarpa cana*, *Tectona* *grandis, Gmelina asiatica, Premna esculenta, Cinnamomum Tamala, Bischofia javanica, Phyllanthus Emblica* and *P. distichus*, * *Putranjiva Roxburghii*, * *Aleurites moluccana*, * *Croton Tiglium, Codiæum variegatum, Mallotus philippinensis*, * *Morus indica, Artocarpus integrifolia* and *A. Lakoocha*, * *Ficus comosa, Casuarina equisetifolia, Corypha umbraculifera, C. Talliera* and *C. elata, Phœnix sylvestris, Cocos nucifera, Areca Catechu, Bambusa Tulda, B. vulgaris, B. Balcooa* and * *B. arundinacea.*

Perhaps the most striking facts in connection with this list are that, although the species as a class belong to plants that one would expect to be readily naturalized in our area, hardly more than 20 per cent. readily reproduce themselves without human assistance; and that in spite of what is so often said to the contrary, over 50 per cent. of these species must have been introduced on purely æsthetic grounds, as there is no obvious economic quality associated with fully one-half of the plants in this list. About 25 per cent. have edible fruits or foliage, other 25 per cent. have useful timbers or are valuable as hedge-plants.

Herbaceous species, natives of South-Eastern Asia that have been deliberately introduced, include the following:—* *Wissadula rostrata, Hibiscus radiatus*, * *Impatiens Balsamina*, * *Clitoria Ternatea*, * *Bryophyllum calycinum*, * *Plumbago rosea* and * *P. zeylanica*, * *Datura fastuosa*, * *Torenia Fournieri, Crossandra undulæfolia, Justicia Betonica, Rhinacanthus communis*, * *Peristrophe tinctoria*, * *Ocimum sanctum*, * *O. gratissimum* and * *O. Basilicum, Coleus aromaticus* and *C. scutellarioides*, * *Celosia argentea* and * *C. cristata*, * *Globba sessiliflora*, * *Canna indica, Crinum latifolium*, * *Typhonium Roxburghii*, * *Selaginella tenera.* The high proportion of species in this list that readily reproduce themselves means very little, because, as regards species of this kind, only those have been admitted into the systematic census which show a tendency to perpetuate themselves in our districts, or which are of economic interest or both.

The number of species purposely introduced from China or Japan is not very great; it includes the following, those that show a tendency to naturalise themselves being again distinguished by an asterisk; in this case it is not necessary to distinguish herbaceous from woody plants:—* *Hibiscus Manihot* and *H. Rosa-sinensis*, * *Triphasia Aurantiola, Nephelium Litchi, Rosa indica, Eriobotrya japonica, Gardenia florida, Ixora stricta, Diospyros Kaki, Nerium odorum*, * *Clerodendron fragrans, Cinnamomum Camphora*, * *Sapium sebiferum*, * *Broussonetia papyrifera, Ficus pumila, Thuja orientalis,* *Cycas revoluta*, *Belamcanda chinensis*, *Hemerocallis fulva*, *Bambusa nana*. Not very many of these Chinese species, which are all very familiar plants in Indian gardens and shrubberies, tend to reproduce themselves unaided.

As might be expected, the number of perennial species, introduced from Central or Western Asia or the Mediterranean littoral is remarkably small. A considerable number of herbaceous species from these regions are included among the plants sown annually during the cold weather, but very few of them appear as self-sown species and none of them do so regularly. The list is as follows:—**Alyssum maritimum*, very occasionally spontaneous; *Hibiscus syriacus*; *Melia Azedarach*, not common; *Vitis vinifera*, very occasionally planted and practically only as a curiosity; *Parkinsonia aculeata*; *Rosa centifolia*; *Lawsonia alba*, as a hedge but thrives very indifferently; *Silybum Marianum*, practically only in European gardens as an annual; **Jasminum Sambac*; **Cannabis sativa*, *Cupressus sempervirens*.

The number of purposely introduced African species is not remarkably large. It includes the following:—*Hibiscus schizopetalus*, *Sesbania ægyptiaca*, *Bauhinia monandra*, **Tamarindus indica*, *Poinciana regia*, *Colvillea racemosa*, *Punica Granatum*, *Vangueria edulis*, *Roupellia grata*, *Cryptostegia grandiflora*, *Jacquemontia cærulea*, **Thunbergia alata*, *Ocimum viride*, *Meriandra bengalensis*, **Euphorbia Tirucalli*, **Borassus flabellifer*, **Pennisetum borbonicum* **Panicum muticum*, **Panicum flavescens*. The percentage of species in the list that have established themselves as an integral part of the flora of the Gangetic delta is unexpectedly small.

When now we turn to the American species that have been deliberately introduced we find a quite different state of affairs. The list is here sufficiently long to render it advisable to separate the herbaceous species from the trees and shrubs, which are as follows:—**Anona squamosa* and **A. reticulata*, **Bixa Orellana*, **Malvastrum tricuspidatum* and **M. spicatum*, **Guazuma tomentosa*, **Malpighia coccifera*, *Blighia sapida*, *Swietenia Mahagoni* and *S. macrophylla*, **Anacardium occidentale*, **Cassia bicapsularis*, *Cæsalpinia coriaria*, **Desmanthus virgatus*, **Leucæna glauca*, **Pithecolobium dulce*, **Enterolobium Saman*, **Psidium Guyava*, **Carica Papaya*, **Cereus pterogonus*, **Opuntia Dillenii*, **Hamelia patens*, *Achras Sapota*, *Allamanda cathartica*, **Thevetia neriifolia*, *Plumeria acutifolia*, *Cordia Sebestena*, **Lantana Camara*, **Duranta Plumieri*, *Bougainvillea glabra* and *B. spectabilis*, *Antigonon leptopus*, **Pedilanthus tithymaloides*, **Jatropha multifida* and **J. Curcas*, **Agave Vera Cruz*.

Over 60 per cent. of the species in this list, which is largely composed of plants introduced for economic reasons, have already become so completely naturalised as to form an integral portion of the wild vegetation of our districts In some cases it will be seen the species have become so familiar to the inhabitants that they have received distinct vernacular names; some of them, indeed, like the *Agave*, one species at least of which was introduced over three hundred years ago, and like *Thevetia*, which was introduced a century ago, enjoy in other parts of India, if not in our districts, the distinction and dignity of having had Sanscrit names evolved to designate them!

But if the extent to which woody species that are natives of the New World have acclimatised themselves in Lower Bengal is very striking, still more striking is the extent to which herbaceous species have accommodated themselves to our deltaic conditions. The following list of American plants that are very familiar in the Calcutta neighbourhood shows that out of 50 species, 80 per cent. have become quite naturalised:—* *Talinum patens*, * *Crotalaria Brownei* and * *C. incana*, * *Phaseolus semierectus*, * *Cassia alata*, * *Neptunia plena*, * *Turnera ulmifolia*, * *Passiflora suberosa* and * *P. fœtida*, *Eupatorium Ayapana* and *E. odoratum*, * *Hymenantherum tenuifolium*, * *Tagetes patula* and *T. erecta*, * *Zinnia pauciflora*, *Tithonia tagetiflora*—this species is not self-sown but propagates itself by its rootstocks, *Helianthus annuus* and * *H. argyrophyllus*, **Cosmos sulfureus*, **Vinca rosea*, **Asclepias Curassavica*, **Phlox Drummondi* — only occasionally self-sown, * *Merremia umbellata*, *Ipomœa purpurea* and *I. tricolor*, * *Quamoclit phœnicea* and *Q. pinnata*, * *Solanum glaucum* and * *S. sisymbriifolium*, *Physalis peruviana*, * *Petunia nyctaginiflora*—only occasionally, * *Browallia elata*, * *Martynia diandra*, * *Ruellia tuberosa*, * *Stachytarpheta indica*, * *Hyptis capitata*—only occasionally, * *Salvia coccinea*, **Mirabilis Jalapa*, * *Gomphrena globosa* * *Rivina humilis*, *Euphorbia pulcherrima*, * *E. geniculata*—only occasionally, and * *E. heterophylla*, * *Ananassa sativa*, * *Cipura paludosa*, * *Zephyranthes tubispatha*—occasionally, *Polianthes tuberosa*, * *Tradescantia discolor*—occasionally, * *Pteris cretica*.

In addition, however, to these intentionally introduced species there are a considerable number of inadvertently introduced plants in our districts. To what extent the species in our districts which are undoubtedly natives of Northern or Western Bengal belong to this category is a matter that hardly repays speculation. Some there certainly are, such as *Andropogon contortus*, *Saponaria Vaccaria*, *Cardamine debilis*, *Lathyrus Aphaca*, *Melilotus alba*, that not only belong to this class but that only appear in our districts owing to repeated introductions, and could no more survive under the conditions prevalent during the south-west monsoon that could many of the cold-weather crops. But, as already explained, there is one point of view from which every species growing on the deltaic alluvium is an introduced species, and nothing can be learned from an examination of the plants with reference to this question that could not be better learned elsewhere and by other means. When, however, it is a question of the species known to be natives of countries other than India, a brief examination of these repays the trouble. The list includes the following:—*Argemone mexicana*, American; *Senebiera pinnatifida*, Mediterranean; *Malachra capitata*, American; *Crotalaria patula*, Indo-Chinese; *Cassia occidentalis*, American; *Mimosa pudica*, American; *Ageratum conyzoides*; American; *Xanthium spinosum*, Mediterranean; *Lagascea mollis*, American; *Synedrella nodiflora*, American; *Tridax procumbens*, American; *Evolvulus nummularifolius*, American; *Nicotiana plumbaginifolia*, American; *Herpestis chamædroides*, American; *Scoparia dulcis*, American; *Peperomia pellucida*, American; *Euphorbia graminea*, American; *Croton sparsiflorus*, American; *Jatropha gossypifolia*, American; *Typhonium inopinatum*, Indo-Chinese; *Paspalum conjugatum*, American.

Of these species one-tenth are of Mediterranean and one-tenth of Indo-Chinese origin, while four-fifths are originally American; these American species include in *Ageratum conyzoides*, *Tridax procumbens*, *Cassia occidentalis*, *Scoparia dulcis*, *Peperomia pellucida*, some of the very commonest species in the neighbourhood of Calcutta.

There is, however, another very interesting feature in connection with these introduced weeds. Their presence indicates a process that is steadily going on; year by year new species become added to the flora of the neighbourhood of Calcutta. Of the species in the list we know that *Argemone mexicana*, *Argeratum conyzoides*, *Cassia occidentalis*, *Mimosa pudica*, *Tridax procumbens* were already members of the flora in 1795. But we also know that as late as 1814 none of the others were yet introduced and naturalised. By 1845, however, *Scoparia dulcis*, *Senebiera pinnatifida*, *Lagascea mollis*, *Malachra capitata*, *Nicotiana plumbaginifolia* had all become established. By 1885 *Evolvulus nummularius*, *Crotalaria patula*, *Jatropha gossypifolia*, *Peperomia pellucida*, *Paspalum conjugatum*, *Synedrella nodiflora* and *Euphorbia graminea* had become established as members of the Calcutta flora. The period since 1885 has seen the introduction and thorough establishment of *Xanthium spinosum*, *Typhonium inopinatum*, *Herpestis chamædroides* and *Croton sparsiflorus*.

III.—SYSTEMATIC CENSUS.

PHANEROGAMIA

THALAMIFLORÆ.

I.—RANUNCULACEÆ.

1. Naravelia DC.

* **Naravelia zeylanica** DC.; H. S. 2; B. P. 193.
v. *Chagal-bati*, *murcha*.
Hedges, thickets; everywhere.

2. Ranunculus Linn.

* **Ranunculus sceleratus** Linn.; H S. 3; B. P. 193.
Banks of nalas and rivers; general.

3. Nigella Linn.

Nigella sativa Linn.; H. S. 4; B. P. 194.
v. *Mugréla*, *kaljira*.
A crop; also a weed in fields; native of S. Europe.

II.—DILLENIACEÆ.

4. Dillenia Linn.

Dillenia indica Linn.; B. P. 195. *D. speciosa* H. S. 18.
v. *Chalta*, *chalíta*.
Planted generally; native of S. E. Asia.

III.—MAGNOLIACEÆ.

5. Michelia Linn.

Michelia Champaca Linn.; H. S. 12; B. P. 197.
v. *Champá*, *champaka*.
Planted near villages and temples; native of S. E. Asia.

IV.—ANONACEÆ.

6. Artabotrys R. Br.

Artabotrys odoratissimus R. Br.; H. S. 15; B. P. 202.
v. *Kantali-champ*.
Planted in gardens; native of S. E. Asia.

7. Cananga Rumph.

Cananga odorata H. f. & T.; B. P. 202. *Uvaria odorata* H. S. 14.
Planted in avenues; native of Malaya.

8. Polyalthia Bl.

Polyalthia longifolia Bth. & Hk. f.; B. P. 204. *Guatteria longifolia* H. S. 16.
v. *Debdáru.*
Planted, roadsides and avenues; native of S. E. Asia.

Polyalthia cerasoides Bth. & Hk. f.; B. P. 204. *Guatteria cerasoides* H. S. 16.
In village-shrubberies, occasionally; native of India.

Polyalthia suberosa Bth. & Hk. f.; B. P. 204. *Guatteria suberosa* H. S. 16.
v. *Bara cháli.*
In village-shrubberies, frequent; native of India.

9. Anona Linn.

Anona squamosa Linn.; H. S. 14; B. P. 206.
v. *Ata.*
In village-shrubberies, common; also cultivated; native of tropical America.

Anona reticulata Linn.; H. S. 14; B. P. 206.
v. *Nona.*
In village-shrubberies, self-sown, very common; also cultivated; native of tropical America.

V.—MENISPERMACEÆ.

10. Tinospora Miers.

* **Tinospora tomentosa** Miers; B. P. 209. *Cocculus tomentosus* H. S. 331.
v. *Padma gulancha.*
Hedges and thickets, general, but rather rare.

* **Tinospora cordifolia** Miers; B. P. 209. *Cocculus cordifolius* H. 330.
v. *Gulancha.*
Hedges and thickets, general and common.

11. Tiliacora Colebr.

* **Tiliacora racemosa** Colebr.; B. P. 210. *Cocculus acuminatus* H. S. 331.
v. *Tiliacora, bhága lata.*
Hedges and shrubberies, general.

12. Cocculus DC.

* **Cocculus villosus** DC.; H. S. 331; B. P. 210.
v. *Huyer.*
Waste places, Hughli district, rare.

13. Stephania Lour.

* **Stephania hernandifolia** Walp.; B. P. 208. *Clypea hernandifolia* H. S. 330.
v. *Ākanádi nimukha.*
Hedges and thickets, general.

14. Cissampelos Linn.

* **Cissampelos Pareira** Linn.; B. P. 208. *C. convolvulacea* H. S. 330.
v. *Ekleja.*
Waste ground, Goghat (Western Hughli district).

VI.—NYMPHÆACEÆ.

15. Nymphæa Linn.

* **Nymphæa Lotus** Linn.; B. P. 213. *N. pubescens* H. S. 8. *N. edulis* H. S. 8.
v. *Kambal.*
Ponds and ditches, everywhere.

* **Nymphæa rubra** Roxb.; H. S. 8; B. P. 213.
v. *Rakto kambal.*
Ponds and ditches, general.

* **Nymphæa stellata** Willd.; H. S 9; B. P. 213.
v. *Nil padma.*
Ponds and ditches, general.
VAR. * **major** Voigt; H. S. 9; B. P. 213.
v. *Bara nil padma.*
Ponds and ditches, general.

16. Euryale Salisb.

* **Euryale ferox** Salisb.; H. S. 8; B. P. 214.
v *Makána.*
Ponds and jhils, 24-Pergunnahs.

17. Nelumbium Juss.

* **Nelumbium speciosum** Willd.; H. S. 9; B. P. 214.
v. *Padma.*
Ponds, everywhere.

VII.—PAPAVERACEÆ.

18. Papaver Linn.

Papaver somniferum Linn.; H. S. 5; B. P. 215.
v. *Posto.*
In fields, Goghat (Western Hughli district).

19. Argemone Linn.

Argemone mexicana Linn.; H S 6; B. P. 216.
v. *Bara shíl kanta.*
Waste places, general; native of West Indies.

VIII.—FUMARIACEÆ.

20. Fumaria Linn.

* **Fumaria parviflora** Lamk; H. S. 7; B. P. 217.
v. *Ban salpha.*
A weed of cultivated ground in the cold weather, general.

IX.—CRUCIFERÆ.

21. Nasturtium R. Br.

* **Nasturtium palustre** DC.; B. P. 219.
A field weed, 24-Pergunnahs; rare.

* **Nasturtium indicum** DC.; B. P. 219. *Sinapis divaricata* H. S 72.
A field weed, general.
VAR. * **benghalense** H. f. & T.; B. P. 219.
v. *Bíl rai.*
A field weed, everywhere.

22. Cardamine Linn.

Cardamine debilis Don; B. P. 219.

A garden weed about Calcutta in cold weather, rare; native of most temperate countries.

23. Brassica Linn.

Brassica juncea H. f. & T.; B. P. 220 *Sinapis ramosa* H. S. 71.

v. *Rai sarisha. chanchi, jhuni.*

A field crop of cold season, sometimes also an escape. Indian mustard.

VAR. * **agrestis**; B. P. 220. *Sinapis patens* H. S. 72.

v. *Bil rai, keel rai.*

Shady places and drier fields; a rains' weed.

Brassica campestris Linn. VAR. **Rapa**. *B. Rapa* H. S. 71.

v. *Shalgám.*

Cultivated about Calcutta; the Turnip.

VAR. **Sarson**; B. P. 220.

v. *Swet rai, swet sarisha, depo.*

A field crop of cold season. Indian Colza or Sarson crop.

Brassica Napus Linn. VAR. **dichotoma**; B. P. 221. *Sinapis dichotoma* H. S. 71.

v. *Sarisha.*

A field crop of cold season. Indian Rape or Tori crop.

Brassica oleracea Linn.; H. S. 70.

v. *Kopi.*

Cultivated especially near Calcutta. The Cabbage. The only variety with a distinctive vernacular name is the Cauliflower, *Paul kopi.*

24. Eruca Linn.

Eruca sativa Lamk; H. S. 72; B. P. 221.

v. *Swet sarisha.*

A cold-weather crop on a small scale about Hughli.

25. Cochlearia Linn.

* **Cochlearia flava** Ham.; B. P. 222.

Banks of river Hughli, very rare.

26. Alyssum Linn.

Alyssum maritimum Linn.; B. P. 222. *Koniga maritima* H. S. 68.

In gardens of Europeans in cold weather; occasionally subspontaneous on rubbish heaps towards close of rainy season; native of S. Europe.

27. Capsella Linn.

Capsella Bursa-pastoris Moench; H. S. 68; B. P. 222.

A garden weed of cold weather near Calcutta, very rare; native of most temperate countries.

28. Lepidium Linn.

Lepidium sativum Linn.; H. S. 70; B. P. 223.

v. *Halim.*

Occasionally cultivated in Hughli district; native of the Orient.

29. Senebiera DC.

Senebiera pinnatifida DC.; H. S. 69; B. P. 223.

A weed of garden ground and waysides; very plentiful about Port Canning; native of S. Europe.

30. Raphanus Linn.

Raphanus sativus Linn.; H. S. 72; B. P. 224.

v. *Mula.*

A cold-weather crop. The Radish.

X.—CAPPARIDEÆ.

31. Cleome Linn.

***Cleome viscosa** Linn.; B. P. 225. *Polanisia icosandria* H. S. 74.

v. *Hurhuria.*

Waste places, fields; general.

32. Gynandropsis DC.

Gynandropsis pentaphylla DC.; H. S. 73; B. P. 225.

v. *Ansarisha, sada hurhuria.*

In gardens, everywhere; also in waste places naturalised, general; cosmopolitan in the Tropics.

33. Capparis Linn.

***Capparis horrida** Linn. f.; H. S. 74; B. P. 226.

v. *Asaria, bagnai.*

Hedges and thickets, mostly west of river Hughli.

Capparis zeylanica Linn.; B. P. 226. *C. brevispina* H. S. 74.

v. *Kalu kera.*

Recorded from Serampore by Voigt; wants confirmation. The species is in the Midnapore jungles and *may* occur in the western part of the Hughli district.

* **Capparis sepiaria** Linn.; H. S. 75; B. P. 227.
v. *Kanta gur kamai.*
Hedges and thickets, everywhere; Sundribuns, sea-face.

84. **Cratæva** Linn.

Cratæva religiosa Forst.; B. P. 227. *C. Roxburghii* H. S. 74.
v. *Tikta shak.*
Village gardens and shrubberies, planted; native of S. E. Asia.

XI.—VIOLACEÆ.

85. **Ionidium** Vent.

* **Ionidium suffruticosum** Ging.; H. S. 77; B. P. 228.
v. *Nunbora.*
Open grassy places, on drier ground, general.

XII.—BIXINEÆ.

86. **Bixa** Linn.

Bixa Orellana Linn.; H. S 85; B. P. 230.
v. *Latkan.*
Cultivated generally, sometimes as if wild near villages; native of tropical America. The Anatto, Arnotto or Rocou.

87. **Flacourtia** Comm

* **Flacourtia Ramontchi** L'Herit. VAR. **sapida**; B. P. 231. *F. sapida* H. S. 83.
v. *Bênchi, katai tambat.*
Hughli district.

* **Flacourtia sepiaria** Roxb.; H. S. 84; B. P. 231.
v. *Bénchi.*
Everywhere; extends into Northern Sundribuns.

XIII.—POLYGALACEÆ.

88. **Salomonia** Lour.

* **Salomonia oblongifolia** DC.; B. P. 233.
Hughli district, Goghat sub-division, scarce.

89. **Polygala** Linn.

* **Polygala chinensis** Linn.; B. P. 235. *P. ciliata* H. S. 98.
v. *Meradu.*
Pasture-land and roadsides, general.

XIV.—CARYOPHYLLACEÆ.

40. Saponaria Linn.

Saponaria Vaccaria Linn.; B. P. 237. *Gypsophila Vaccaria* H. S. 175.
v. *Sabuni.*
In fields, a cold-weather weed, Hughli district, occasional; east of the Hughli, rare and casual.

41. Stellaria Linn.

Stellaria media Linn.; H. S. 178; B. P. 237.
Occasionally in gardens near Calcutta as a cold-weather weed; does not persist and probably is always introduced with garden seeds from Europe; native of Asiatic and northern temperate countries.

42. Spergula Linn.

Spergula pentandra Linn.; H. S. 180; B. P. 238.
In gardens near Calcutta; like the preceding species, but never seen except by Roxburgh; native of Europe.

43. Polycarpon Linn.

* **Polycarpon Loeflingiæ** Bth. & Hk. f.; B. P. 238. *Hapalosia Loeflingiæ* H. S. 180.
v. *Ghima.*
Fields and waste places, general.

44. Polycarpæa Lamk.

* **Polycarpæa corymbosa** Lamk; B. P. 239.
Hughli district, Goghat sub-division.

XV.—PORTULACACEÆ.

45. Portulaca Linn.

* **Portulaca oleracea** Linn.; H. S. 173; B. P. 240.
v. *Bara laniya.*
Waste ground, everywhere.

* **Portulaca quadrifida** Linn.; H. S. 173; B. P. 240. *P. meridiana* H. S. 173.
v. *Chhota laniya.*
Waste ground, general but never very common.

46. Talinum Adans.

Talinum patens Willd.; B. P. 240. *T. cuneifolium* H. S. 174, at least in part.

In gardens, very rarely cultivated, but near Calcutta not infrequent as a naturalised weed; native of America. *T. cuneifolium*, a native of Asia and wild in some parts of India, is also occasionally cultivated, but the writer has never seen it occurring spontaneously.

XVI.—TAMARICACEÆ.

47. Tamarix Linn.

* **Tamarix gallica** Linn.; H. S. 179; B. P. 242.
v. *Jhau, bara jhau, jaura.*
Banks of rivers and edges of marshes.

* **Tamarix dioica** Roxb.; H. S. 179; B. P. 242.
v. *Lal jhaú.*
Banks of rivers and edges of marshes.

XVII.—ELATINACEÆ.

48. Bergia Linn.

* **Bergia verticillata** Willd.; H. S. 99; B. P. 243.
v. *Lal keshuriya.*
Rice-fields and river-banks, general but not common.

* **Bergia ammannioides** Roxb.; H. S. 99; B. P. 243.
v. *Lal keshuriya.*
Rice-fields and river-banks, common and general.

XVIII.—GUTTIFERÆ.

49. Calophyllum Linn.

Calophyllum inophyllum Linn.; H. S. 87; B. P. 246.
v. *Káth champa, sultana champa.*
Planted occasionally about Calcutta; native of coasts of S. E. Asia.

50. Garcinia Linn.

Garcinia Xanthochymus Hook. f.; B. P. 247.
v. *Dampel.*
Planted occasionally in native gardens; native of S. E. Asia.

XIX.—MALVACEÆ.

51. Malvastrum A. Gray.

Malvastrum tricuspidatum A. Gray ; B. P. 257. *Malva americana* H. S. 111.
Hedges and waste places, general ; native of America.

Malvastrum spicatum A. Gray ; B. P. 257.
Waste places near Calcutta, occasional ; native of America.

52. Sida Linn.

* **Sida veronicæfolia** Lamk ; B. P. 258. *S. humilis* H. S. 113.
v. *Junka.*
Waste places, everywhere.

* **Sida cordifolia** Linn. ; H. S. 113 ; B. P. 258.
v. *Beréla, barjala.*
Waste ground. Goghat ; also reported from Serampore by Voigt.

* **Sida acuta** Burm. ; H. S. 113 ; B. P. 259.
v. *Kuréta.*
Waste places, everywhere.

* **Sida rhombifolia** Linn. ; H. S. 113 ; B. P. 259.
v. *Lal beréla, lal barjala.*
Fields and waste places, common, everywhere.

* **Sida rhomboidea** Roxb. ; H. S. 113. *S. rhombifolia* VAR. *rhomboidea* B. P. 259.
v. *Swet beréla, swet barjala.*
Fields and waste places, general but not common.

53. Abutilon Gærtn.

* **Abutilon indicum** G. Don ; H. S. 114 ; B. P. 260. *A. populifolium* H. S. 114. *A. asiaticum* H. S. 114.
v. *Petari jhampi.*
Waste places, everywhere.

* **Abutilon hirtum** G. Don ; B. P. 1271. *A. graveolens* H. S. 114.
v. *Jhampi, kangani.*
Waste places, general but not common.

54. Wissadula Medik.

Wissadula rostrata Planch. ; B. P. 260. *Abutilon periplocifolium* H. S. 114.
Sometimes cultivated and often spontaneous ; native of Malaya.

55. **Urena** Linn.

* **Urena lobata** Linn.; H. S. 112; B. P. 261.
v. *Ban okra.*
Waste places, everywhere.

* **Urena sinuata** Linn.; H. S. 112; B. P. 261.
v. *Kunguiya.*
Waste places, western parts, rare.

56. **Malachra** Linn.

Malachra capitata Linn.; H. S. 112; B. P. 262.
v. *Ban bhindi.*
Waste places, everywhere; native of West Indies.

57. **Hibiscus** Medik.

* **Hibiscus ficulneus** Linn.; B. P. 265. *Abelmoschus ficulneus* H. S. 119.
v. *Ban dhéras, jangli bhindi.*
Waste places, Hughli district, rare.

Hibiscus esculentus Linn.; B. P. 265. *Abelmoschus esculentus* H. S. 118.
v. *Bhindi, dhéras.*
In gardens; cultivated throughout the Tropics.

Hibiscus Abelmoschus Linn.; B. P. 265. *Abelmoschus moschatus* H. S. 119.
v. *Kalkastári, mushak-dhana.*
Near villages, very rare, perhaps only an escape; native of S. E. Asia.

Hibiscus Manihot Linn.; B. P. 266. *Abelmoschus Manihot* H. S. 120.
In gardens, also naturalised near Calcutta; native of China.

Hibiscus tetraphyllus Roxb.; B. P. 266. *Abelmoschus tetraphyllus* H. S. 119.
Thickets near Calcutta; reported by Roxburgh but not met with since; wild in Concan and Canara.

Hibiscus hirtus Linn.; H. S. 118; B. P. 266.
v. *Lal surgumuni.*
Waste places, occasionally; probably almost always only as an escape; native of India.

* **Hibiscus vitifolius** Linn.; H. S. 117; B. P. 267.
v. *Ban kapás.*
Margins of fields and village-shrubberies, everywhere.

Hibiscus panduriformis Burm.; H. S. 117; B. P. 267.
Serampore; reported by Voigt, but not met with since; wild in India.

Hibiscus radiatus Willd., H. S. 116; B. P. 267.
In gardens, often; native of Indo-China and Malaya.

Hibiscus cannabinus Linn.; H. S. 117. B. P. 267.
v. *Mesta pát*, *Ambya pát.*
In fields, cultivated, but very seldom.

Hibiscus Sabdariffa Linn.; H. S. 118; B. P. 267.
v. *Mesta.*
In gardens, general; cultivated throughout the Tropics.

Hibiscus syriacus Linn. H. S. 117; B. P. 268.
v. *Sada juva.*
In gardens, everywhere: native of the Orient.

Hibiscus Rosa-sinensis Linn.; H. S. 116; B. P. 268.
v. *Juva.*
In gardens, everywhere; native of China.

Hibiscus schizopetalus Hook. f.
In gardens, general; native of Africa.

Hibiscus mutabilis Linn.; H. S. 118; B. P. 268.
v. *Thalpadma.*
In gardens, everywhere; native of Malaya.

* **Hibiscus tortuosus** Wall.; B. P. 268.
Estuary of the Hughli, collected by Wallich.

* **Hibiscus tiliaceus** Linn.; B. P. 269. *Paritium tiliaceum* H. S. 120.
P. tortuosum H. S. 120.
v. *Bola.*
Sundribuns; also river banks as far north as Calcutta.

58. Gossypium Linn.

Gossypium herbaceum Linn.; H. S. 121; B. P. 269.
v. *Kapás*, *tula*, *rui.*
Cultivated; native of India.

59. Thespesia Corr.

* **Thespesia populnea** Corr.; H. S. 120; B. P. 270.
v. *Parás*, *parás pipal.*
Sundribuns; also planted about Calcutta.

60. Bombax Linn.

***Bombax malabaricum** DC.; B. P. 271. *Salmalia malabarica* H. S. 106.
v. *Simal.*
Wild and planted, everywhere.

61. Eriodendron DC.

Eriodendron anfractuosum DC.; B. P. 271. *Gossampinus Rumphii* H. S. 105.
v. *Swet simal.*
Planted and very occasionally spontaneous, near Calcutta chiefly; native of S. E. Asia.

XX.—STERCULIACEÆ.

62. Sterculia Linn.

Sterculia alata Roxb.; B. P. 274. *Pterygota Roxburghii* H. S. 103
v. *Buddha ki narikel.*
Planted in avenues; native of Indo-China.

Sterculia colorata Roxb.; B. P. 274. *Erythropsis Roxburghiana* H. S. 104.
v. *Samarri.*
Planted occasionally near Calcutta; native of India.

Sterculia fœtida Linn.; H. S. 108; B. P. 274.
v. *Jangli badám.*
Planted, roadsides and near temples; native of S. E. Asia.

63. Heritiera Ait.

* **Heritiera minor** Roxb.; H. S. 103; B. P. 274.
v. *Sundri.*
Sundribuns.

64. Kleinhovia Linn.

Kleinhovia Hospita Linn.; H. S. 169; B. P. 272.
v. *Bola.*
Planted about Calcutta; native of S. E. Asia.

65. Helicteres Linn.

* **Helicteres Isora** Linn.; B. P. 275. *Isora corylifolia* H. S. 102.
v. *Atmora.*
Hughli district, in the drier parts, not uncommon.

66. Pterospermum Schreb.

Pterospermum acerifolium Willd.; H. S. 107; B. P. 276.

v. *Kanak champa.*

Planted very often on roadsides and in native enclosures; native of S. E. Asia.

67. Pentapetes Linn.

* **Pentapetes phœnicea** Linn.; H. S. 107; B. P. 277.

v. *Kat lata, bandhuli.*

Waste places and wet rice-fields, general.

68. Melochia Linn.

* **Melochia corchorifolia** Linn.; B. P. 277. *Lochennia corchorifolia* H. S. 109.

v. *Tiki okra, bil pata.*

Waste places, dry fields and grassy glades, everywhere.

69. Waltheria Linn.

* **Waltheria indica** Linn.; H. S. 110; B. P. 278.

v. *Khar dudhi.*

Waste places, general but scarce.

70. Abroma Jacq.

Abroma augusta Linn.; H. S. 108; B. P. 278.

v. *Ulat kambal.*

Occasionally cultivated, frequent as an escape; native of Eastern Asia.

71. Guazuma Plum.

Guazuma tomentosa Kunth; H. S. 108; B. P. 278.

v. *Nipál tunth.*

Planted, but more often self-sown, everywhere, and very plentiful; native of tropical America.

XXI.—TILIACEÆ.

72. Brownlowia Roxb.

* **Brownlowia lanceolata** Benth.; B. P. 281.

v. *Bola sundri, kedar sundri.*

Sundribuns.

73. Grewia Linn.

Grewia asiatica Linn.; H. S. 128; B. P. 283.

v. *Phalsa.*

Serampore, according to Voigt, but almost certainly only planted as it occasionally is in native gardens elsewhere; native of India.

Grewia polygama Roxb.; H. S. 127.

Also stated by Voigt to occur at Serampore, but more certainly only as a planted species; native of India.

* **Grewia lævigata** Vahl; H. S. 127; B. P. 283.
v. *Káth bimla.*
Village shrubberies, west of the river Hughli, occasional.

Grewia multiflora Juss.; B. P. 284. *G. sepiaria* H. S. 128.
v. *Pani sara.*
A favourite hedge-plant, sometimes also self-sown; native of India.

* **Grewia hirsuta** Vahl; B. P. 284. *G. trichodes* H. S. 127.
Waste places in Goghat, Western Hughli district; also at Serampore, according to Voigt.

74. Triumfetta Linn.

* **Triumfetta rhomboidea** Jacq.; B. P. 285. *T. angulata* H. S. 127. *T. trilocularis* H. S. 127.
v. *Ban okra.*
Waste places, everywhere.

75. Corchorus Linn.

* **Corchorus acutangulus** Lamk; H. S. 127; B. P. 286.
v. *Tita pát.*
Waste places and dry fields, everywhere.

* **Corchorus fascicularis** Lamk; H. S. 126; B. P. 286.
v. *Jangli pát, bil nalita.*
Serampore, according to Voigt; needs verification.

* **Corchorus trilocularis** Linn.; H. S. 126; B. P. 286.
Serampore, according to Voigt; needs verification.

* **Corchorus olitorius** Linn.; H. S. 126; B. P. 286.
v. *Pát.*
An annual crop in the rains; native of Bengal. Jute.

Corchorus capsularis Linn.; H. S. 127; B. P. 286.
v. *Pát, ghi nalita pát.*
An annual crop in the rains; native of China. Jute.

XXII.—LINACEÆ.

76. Linum Linn.

Linum usitatissimum Linn ; H. S. 100; B. P. 289.
v. *Masína*, *tisi*.
A cold-weather crop; native of the Orient.

XXIII.—MALPIGHIACEÆ.

77. Malpighia Linn.

Malpighia coccifera Linn.; H. S. 170.
Planted as a hedge, but sometimes also as if wild, *e.g.* near Rajapur (*Kurz*).

78. Hiptage Gærtn.

Hiptage Madablota Gærtn.; H. S. 170; B. P. 290.
v. *Basanti*, *mahadeo lata*.
Planted frequently; recorded by Voigt from Serampore, but almost certainty only as a garden species; native of S. E. Asia.

XXIV.—ZYGOPHYLLACEÆ.

79. Tribulus Linn.

Tribulus cistoides Linn.; H. S. 184; B. P. 292.
Collected once near Calcutta by Edgeworth, most probably only a garden escape; native of the Tropics.

Tribulus terrestris Linn.; B. P. 292. *T. lanuginosus* H. S. 184.
Serampore, according to Voigt; needs confirmation.

XXV.—GERANIACEÆ.

80. Oxalis Linn.

* **Oxalis corniculata** Linn.; H. S. 191; B. P. 294.
v. *Amrúl*, *chuka-tripati*.
Fields, gardens and waste places, everywhere.

81. Biophytum DC.

* **Biophytum sensitivum** DC.; H. S. 191; B. P. 295.
v. *Ban naranga*.
Fields, gardens and waste places, everywhere.

82. Averrhoa Linn.

Averrhoa Carambola Linn.; H. S. 191; B. P. 296.
v. *Kamaranga, kamarak.*

Near villages, often, cultivated; occasionally as if wild; native of Malaya.

Averrhoa Bilimbi Linn.; H. S. 191; B. P. 296.
v. *Bilimbi.*

Near villages, everywhere, cultivated; often as if wild; native of Malaya.

83. Impatiens Linn.

Impatiens Balsamina Linn.; H. S. 189; B. P. 296.
v. *Dúpati.*

In gardens, everywhere; often also as an escape; native of S. E. Asia.

84. Hydrocera Bl.

* **Hydrocera triflora** W. & A.; H. S. 189; B. P. 297.
v. *Damuti.*

Ditches, 24-Pergunnahs, rare.

XXVI.—RUTACEÆ.

85. Acronychia Forst.

Acronychia laurifolia Bl.; B. P. 300. *Cyminosma pedunculata* H. S. 183.

In scrub jungles near Matla (*Kurz*!); probably an escape from cultivation; native of Indo-China and Malaya.

86. Glycosmis Corr.

* **Glycosmis pentaphylla** Corr.; H. S. 139; B. P. 300.
v. *Ashhoura.*

Thickets and village-shrubberies, everywhere.

87. Clausena Burm.

* **Clausena heptaphylla** W. & A.; H. S. 141; B. P. 301.
v. *Karan phál.*

Village-shrubberies, general, but not plentiful.

88. Murraya Linn.

Murraya exotica Linn.; H. S. 139; B. P. 302. *M. paniculata* H. S. 140.
v. *Kamini.*

A common hedge; often also in village-shrubberies, but neither the shrubby nor the arboreous form truly wild in our districts; native of S. E. Asia.

Murraya Kœnigii Spreng.; B. P. 302. *Bergera Kœnigii* H. S. 139.
v. *Barsanga.*
Planted near villages. Curry leaf; native of India and Indo-China.

89. Triphasia Lour.

Triphasia Aurantiola Lour.; B. P. 303. *T. trifoliata* H. S. 138.
v. *Chini narangi.*
In gardens, but also not infrequently as if wild in village-shrubberies; native of China.

90. Feronia Gærtn.

Feronia Elephantum Corr.; H. S. 141; B. P. 305.
v. *Káth bél.*
In village-shrubberies planted and occasionally self-sown; considered by Voigt wild at Serampore; native of drier parts of India.

91. Ægle Corr.

* **Ægle Marmelos** Corr.; H. S. 141; B. P. 305.
v. *Bél, vilva.*
Near villages, everywhere; often planted, but so frequently as if wild that it may almost be considered native generally; is truly native in Western Hughli district (Goghat).

92. Citrus Linn.

Citrus decumana Linn.; H. S. 141; B. P. 307.
v. *Batavi-nimbu.*
Cultivated everywhere, but occasionally as if wild in village shrubberies; native of Malaya and Polynesia.

Citrus medica Linn.; B. P. 306. VAR. **typica.** *C. medica* H. S. 142.
v. *Beg pura.*
Occasionally cultivated. The Citron; native of Eastern Asia.
VAR. **Limonum**. *C. Limonum* H. S. 142.
v. *Karna-nimbu.*
Cultivated fairly generally. The Lemon; native of India.
VAR. **acida.** *C. Bergamia* H. S. 142.
v. *Pati-nimbu, kaggi-nimbu, gora-nimbu, kamarali-nimbu.*

Cultivated everywhere in many varieties, the two chief forms being the *Pati* or "common, round" and the *Kaggi* or "long, small" and particularly the latter. The Acid Lime; native of S. E. Asia.

XXVII.—BURSERACEÆ.

93. Garuga Roxb.

Garuga pinnata Roxb.; H. S. 150; B. P. 311.

v. *Júm, túm kharpat, nil bhádi.*

Planted occasionally and perhaps sometimes self-sown; given by Voigt as occurring at Serampore, but certainly not truly wild; native of India and Indo-China.

XXVIII.--MELIACEÆ.

94. Melia Linn.

Melia Azedarach Linn.; H. S. 133; B. P. 313.

v. *Bakarjan, gora nim, maha ném.*

Planted on roadsides and in avenues; native of the Orient and perhaps wild in Upper India.

* **Melia Azadirachta** Linn.; B. P. 314. *Asadirachta indica* H. S. 133.

v. *Ním.*

In village-shrubberies, everywhere; so often spontaneous that it may almost be considered native. The Margosa. Voigt is almost certainly correct in considering that the *Ním* is not a *Melia.*

95. Amoora Roxb.

Amoora Rohituka W. & A.; H. S. 134; B. P. 316.

v. *Tikta-ráj.*

Planted very often; given by Voigt as occurring at Serampore, but certainly not truly wild in our districts; native of India and Indo-China.

* **Amoora cucullata** Roxb.; H. S. 134; B. P. 316.

v. *Amúr latmi.*

Sundribuns.

96. Carapa Aubl.

* **Carapa obovata** Bl.; B. P. 318. *Xylocarpus Granatum* H. S. 136.

v. *Dhundol, posher, pussur.*

Sundribuns.

There is another species of *Carapa* to which the name *Pussur* more properly belongs; it is also met with in the Sundribuns, but it is not certain that it occurs in the western or 24-Pergunnahs portion of that region.

97. Swietenia Linn.

Swietenia Mahagoni Linn.; H. S. 137; B. P. 319.
v. *Mahagni* (the American name).
Planted in avenues.

Swietenia macrophylla King; B. P. 319.
v. *Bara mahagni.*
Largely planted in avenues and on roadsides.

98. Cedrela Linn.

Cedrela Toona Roxb.; H. S. 137; B. P. 320.
v. *Tún.*

Planted everywhere, and often self-sown near villages; given by Voigt as occurring at Serampore, but probably not truly wild in our districts; native of India.

XXIX.—OLACINEÆ.

99. Olax Linn.

Olax phœnicarpa Roxb.; H. S. 31.
v. *Moicha.*

Serampore, *Voigt*; an altogether doubtful plant; it may be a form of *Olax scandens* which has not, however, been collected within our districts, though it occurs both in the damp forests of the North-Eastern Sundribuns and in the drier parts of Western Bengal and Behar just beyond their borders: the plant ought, therefore, to be carefully looked for.

XXX.—CELASTRINEÆ.

100. Elæodendron Jacq.

Elæodendron glaucum Pers.; H. S. 167; B. P. 329.
Planted about Calcutta; native of India.

101. Salacia Linn.

* **Salacia prinoides** DC.; H. S. 168; B. P. 331.
v. *Modhu phál.*
Western Sundribuns.

XXXI.—RHAMNACEÆ.

102. Zizyphus Juss.

Zizyphus Jujuba Linn.; H. S. 145; B. P. 333.
v. *Bér, kul gachh.*
Planted, everywhere; native of S. E. Asia.

* **Zizyphus Œnoplia** Mill.; H. S. 145; B. P. 334.
v. *Shiakol.*
Village-shrubberies, everywhere.

103. Ventilago Gærtn.

* **Ventilago maderaspatana** Gærtn.; H. S. 146; B. P. 334.
v. *Ruktu pita.*
Western Hughli district, Goghat.

104. Gouania Linn.

* **Gouania leptostachya** DC.; H. S. 147; B. P. 335.
Serampore, according to Voigt; not met with by others in our districts.

XXXII.—AMPELIDEÆ.

105. Vitis Linn.

* **Vitis latifolia** Roxb.; H. S. 29; B. P. 337.
v. *Govila.*
Woods and thickets, everywhere.

* **Vitis quadrangularis** Wall.; H. S. 27; B. P. 338.
v. *Harjora.*
Woods and thickets, general.

* **Vitis adnata** Wall.; H. S. 38; B. P. 338.
Village-shrubberies, everywhere.

Vitis lanata Roxb.; H. S. 29.
Serampore, according to Voigt; not impossibly, but needs verification; is plentiful in West Bengal.

* **Vitis repanda** W. & A.; B. P. 338. *V. pallida* H. S. 28. *V. glauca* H. S. 28.
v. *Goáliya lata, gar goáliya.*
Hedges and thickets, Hughli district.

Vitis indica Linn.; H. S. 29.
v. *Amclouka.*

Serampore, according to Voigt, needs verification. Probably some other species is intended, *V. indica* being apparently confined to S. India.

Vitis vinifera Linn.; H. S. 29.
v. *Angúr gachh.*
Very occasionally cultivated in our districts.

* **Vitis trifolia** Linn.; B. P. 338. *V. carnosa* H. S. 28.
v. *Amal lata, soné kesar.*
Thickets, hedges and forests, everywhere, is very plentiful in the Western Sundribuns.

* **Vitis pedata** Vahl; H. S. 28; B. P. 339.
v. *Goáli lata.*
Hedges and thickets, general.

Vitis elongata Wall.; H. S. 28.
Serampore, according to Voigt; not impossibly, but needs verification; is plentiful in the submontane forests of Sikkim.

106. Leea Linn.

* **Leea macrophylla** Roxb.; H. S. 29; B. P. 341.
v. *Dhól samudra.*
Village-shrubberies, general, but not plentiful.

* **Leea crispa** Linn.; H. S. 29; B. P. 340.
v. *Ban chalita.*
Village-shrubberies, rare.

* **Leea robusta** Roxb.; H. S. 29; B. P. 340.
v. *Haramada.*
Village-shrubberies, rare.

* **Leea æquata** Linn.; B. P. 340. *L. hirta* H. S. 30.
v. *Kák jhanga.*
Village-shrubberies, not uncommon, general.

* **Leea sambucina** Willd.; B. P. 340. *L. Staphylea* H. S. 30.
v. *Kukur jhiwa.*
Village-shrubberies, general.

XXXIII.—SAPINDACEÆ.

107. Cardiospermum Linn.

* **Cardiospermum Halicacabum** Linn.; H. S. 93; B. P. 342.
v. *Shibjhul, nayaphutki.*
Hedges, thickets and waste places, everywhere.

108. Allophylus Bl.

* **Allophylus Cobbe** Linn. VAR. **serrata**; B. P. 343. *Schmiedelia serrata* H. S. 93.
v. *Rakhal phul.*
Village-shrubberies, general.

109. Sapindus Linn.

Sapindus trifoliatus Linn.; B. P. 344. *S. emarginatus* H. S. 94.
v. *Bor rítha.*
Planted near villages; native of India.

Sapindus Mukorossi Gærtn.; B. P. 344. *S. detergens* H. S. 94.
v. *Rítha.*
Planted near villages; native of India.

110. Erioglossum Bl.

Erioglossum edule Bl.; B. P. 344. *Sapindus rubiginosus* H. S. 94.
Village-shrubberies and about tanks, not very general, but usually as if wild; native of S. E. Asia.

111. Aphania Bl.

* **Aphania Danura** Radlk.; B. P. 345. *Sapindus Danura* H. S. 94.
v. *Danúra.*
Western Sundribuns; village-shrubberies south of Calcutta and Howrah.

112. Blighia Kœn.

Blighia sapida Kœn. *Cupania sapida* H. S. 94.
In gardens near Calcutta, occasionally; native of America.

113. Nephelium Linn.

Nephelium Litchi Camb.; H. S. 95; B. P. 346.
v. *Litchi.*
Planted generally; native of China. The Lichi.

Nephelium Longana Camb.; H. S. 95; B. P. 346.
v. *Ashphál.*
Planted occasionally; native of Malaya. The Longan.

XXXIV.—ANACARDIACEÆ.

114. Mangifera Linn.

Mangifera indica Linn.; H. S. 272; B. P. 352.
v. *Ám, ámb.*
Planted everywhere; native of Indo-China. The Mango.

115. **Anacardium** Linn.

Anacardium occidentale Linn.; H. S. 270; B. P. 354.
v. *Hidgli badám, kaju.*
Planted occasionally; native of America.

116. **Odina** Roxb.

* **Odina Wodier** Roxb.; H. S. 275; B. P. 354.
v. *Jiyal.*
Village-shrubberies, everywhere.

117. **Spondias** Linn.

Spondias mangifera Willd.; H. S. 143; B. P. 356.
v. *Ámra.*
In village-shrubberies, everywhere; often planted, still ofteuei self-sown; native of S. E. Asia.

Spondias dulcis Willd.; H. S. 144; B. P. 356.
v. *Bilati ámra.*
Occasionally planted; native of Polynesia.

XXXV.—MORINGACEÆ.

118. **Moringa** Lamk.

Moringa pterygosperma Gærtn.; H. S. 78; B. P. 357.
v. *Sajína.*
Planted, everywhere, but often also self-sown near villages; cultivated throughout the Tropics.

CALYCIFLORÆ.

XXXVI.—LEGUMINOSÆ.

119. **Cicer** Linn.

Cicer arietinum Linn.; H. S. 226; B. P. 366.
v. *Channa.*
A cold-weather crop, not much grown in our districts; native of countries bordering on the Mediterranean. The Chick-Pea.

120. **Vicia** Linn.

Vicia sativa Linn.; H. S. 226; B. P. 366.
v. *Ankári.*
A cold-weather crop, rarely met with in our districts; also in one form, a cold-weather field weed, general; native of Europe and th Orient. The Tare.

*** Vicia hirsuta** Linn.; B. P. 367. *Ervum hirsutum* H. S. 226.
v. *Masúr-channa.*

A cold-weather field weed, everywhere; very occasionally also a fodder crop.

21. **Lens** Gren. & Godr.

Lens esculenta Moench; B. P. 367. *Ervum Lens* H. S. 226.
v. *Masúr, masuri.*

A cold-weather field crop, mostly in Hughli district; native of Europe. The Lentil.

122. **Lathyrus** Linn.

Lathyrus Aphaca Linn.; H. S. 227; B. P. 368.
v. *Jangli mátár, masúr channa.*

A cold-weather field weed, general, also often in grassy places where cattle feed; has no claim to be a native of our districts; native of Europe.

Lathyrus sativus Linn.; H. S. 227; B. P. 368.
v. *Kesári, kassúr.*

A cold-weather field crop; native of S. Europe. The Vetch.

123. **Pisum** Linn.

Pisum sativum Linn.; H. S. 226; B. P. 369.
v. *Mátár, kabuli mátár.*

In gardens about Calcutta and occasionally as a field crop in the Hughli district; native, probably, of the Orient.

Pisum arvense Linn.; B. P. 369. *P. sativum* VAR. *quadratum* H. S. 227.
v. *Mátár, chhoto mátár.*

A field crop of the cold weather, general; native, probably, of Western Asia.

124. **Abrus** Linn.

*** Abrus precatorius** Linn.; H. S. 228; B. P. 369.
v. *Kúnch, chun-hati.*

Hedges and thickets, general.

125. **Crotalaria** Linn.

Crotalaria quinquefolia Linn., H. S. 208; B. P. 373.

Serampore, according to Voigt.; by no means impossible, but needs verification; native of India and Indo-China.

Crotalaria Brownei Bert.; H. S. 207; B. P. 373.
In gardens occasionally, and sometimes as an escape in the neighbourhood of Calcutta, introduced from the West Indies.

Crotalaria incana Linn.; H. S. 207; B. P. 373.
In gardens occasionally, and frequent as an escape in the neighbourhood of Calcutta; introduced from the West Indies.

Crotalaria Saltiana Andr.; B. P. 373. *C. striata* H. S. 207.
v. *Ban çan.*
Waysides and waste places, everywhere; especially common in Sundribuns cleanings. Though now one of our most plentiful weeds this is not mentioned by Roxburgh and is probably an introduction to Bengal of less than 100 years'standing; now cosmopolitan in the Tropics; probably originally native of Africa.

Crotalaria laburnifolia Linn.; H. S. 207; B. P. 373.
v. *Múna.*
Serampore, according to Voigt; not improbably, as it is fairly abundant in East Bengal, but needs verification for our districts; native of Eastern Asia.

Crotalaria medicaginea DC.; B. P. 373. *C. trifoliastrum* H. S. 207.
Serampore, according to Voigt; not altogether impossible, as it is plentiful in Chota Nagpur, but needs verification for our districts; native of the drier parts of India.

Crotalaria alata Ham.; H. S. 205; B. P. 373.
Waste places near Calcutta and Howrah, but rare and certainly introduced in our districts; native of S. E. Asia.

* **Crotalaria verrucosa** Linn.; H. S. 206; B. P. 373.
v. *Ban çan.*
Waste places and fairly dry fields, everywhere.

Crotalaria juncea Linn.; H. S. 206; B. P. 374.
v. *Çan.*
A field crop, everywhere. The Sunn or Indian Hemp; native of S. E .Asia.

* **Crotalaria retusa** Linn.; H. S. 206; B. P. 374.
v. *Bhil jhanjhan.*
Waste places, everywhere.

Crotalaria sericea Retz; H. S. 206; B. P. 374.
v. *Pipali jhanjhan.*
Waste places, but only about Calcutta, Howrah, Chinsura and Serampore; hardly native in our districts; native of S. E. Asia.

* **Crotalaria mysorensis** Roth ; B. P. 374.

Drier grassy glades and fields, west of the Hughli only, and not very common.

Crotalaria nana Burm. VAR. **patula** B. P. 374.

Dry grassy glades about Shibpur, introduced ; native of Burma.

Crotalaria calycina Schrank ; B. P. 375. *C. anthylloides* H. S. 205.

Serampore, according to Voigt; not at all impossibly, but needs verification for our districts; native of S. E. and E. Asia.

* **Crotalaria prostrata** Roxb.; H. S. 207; B. P. 375.

v. *Chhota jhanjhan.*

Drier grassy glades and fields, everywhere.

* **Crotalaria acicularis** Ham.; B. P. 375.

v. *Chhota jhanjhan.*

Drier grassy glades and fields, general; often confused with *C. prostrata.*

126. Flemingia Roxb.

* **Flemingia congesta** Roxb.; H. S. 229; B. P. 378.

v. *Bara salphan, bhalia.*

Sundribuns, Calcutta, Serampore, according both to Roxburgh and Voigt, but evidently rare; no example from our districts exists in the Calcutta Herbarium, and the writer has never succeeded in meeting with the plant: it is common in North Bengal.

127. Cylista Ait.

***Cylista scariosa** Ait.; H. S. 236; B. P. 379.

Hedges and thickets, but not very common.

128. Rhynchosia Lour.

* **Rhynchosia rufescens** DC.; B. P. 380.

Waste places, rare.

* **Rhynchosia viscosa** DC.; B. P. 380. *Dolichos glutinosus* H. S. 231.

v. *Shim bhatráji.*

Hedges and thickets, general, but not plentiful.

* **Rhynchosia sericea** Span.; B. P. 381.

Hedges and thickets, general, but not common.

* **Rhynchosia bracteata** Benth.; B. P. 381.

Hedges and thickets, rare.

129. Atylosia W. & A.

* **Atylosia scarabæoides** Benth.; B. P. 383. *Cantharospermum pauciflorum* H. S. 236.

v. *Banúr kalai.*

Hedges and thickets, everywhere.

130. Cajanus DC.

Cajanus indicus Spreng.; H. S. 236; B. P. 383.

v. *Arhar.*

A field crop, everywhere. The Pigeon Pea; native possibly of Africa; certainly nowhere wild in India; probably nowhere wild in Asia.

131. Phaseolus Linn.

Phaseolus semierectus Linn.; H. S. 230; B. P. 386.

In village-shrubberies and waste places, near Calcutta and Howrah only; introduced; native of America.

* **Phaseolus adenanthus** G. F. Mey.; B. P. 386. *P. rostratus* H. S. 230.

v. *Ban barbati.*

Western Sundribuns, on river banks; banks of the Hughli as far north as Serampore; occasionally in village-shrubberies near the river Hughli.

Phaseolus lunatus Linn.; H. S. 250; B. P. 386.

In gardens, cultivated; native of S America. The Lima Bean.

Phaseolus vulgaris Linn.; H. S. 229; B. P. 386.

In gardens, cultivated; native of S. Europe and the Orient. The French Bean.

Phaseolus multiflorus Willd.; H. S. 230; B. P. 389.

In gardens of European residents, cultivated; native of America. The Scarlet Runner.

Phaseolus trilobus Ait.; H. S. 231; B. P. 387.

v. *Mugáni.*

Fields and waste places, everywhere.

* **Phaseolus sublobatus** Roxb.; H. S. 230; B. P. 387.

v. *Ghora mung.*

Serampore, according to Voigt.; not impossibly, as it is plentiful in Behar and Chota Nagpur, but it needs verification for our districts.

Phaseolus Mungo Linn.; B. P. 387.

v. *Tikuri kalai.*

Cultivated, everywhere; native of India.

There is some confusion in the H. S. as regards this plant; the vernacular name *Tikari* is always applied to this plant, which has yellow flowers, whereas Voigt associates the name with *Dolichos pilosus*, which is a *Vigna* with blue flowers: this plant is in fact omitted by Voigt though it is the commonest of the five allied forms cultivated in our districts. The confusion has, however, been shared by the majority of those who have dealt with these pulses.

VAR. **Roxburghii** B. P. 387. *Phaseolus Roxburghii* H. S. 221.
v. *Másh kalai, urid.*
Cultivated, mainly in the Hughli district; native of India.

Phaseolus radiatus Linn.; B. P. 387. *P. Mungo* H. S. 230.
v. *Mung, káli mung.*
A field crop, everywhere; native of India.
VAR. **aurea** B. P. 388. *P. aureus* H. S. 231.
v. *Sona mung.*
A field crop, about Calcutta; native of China.
VAR. **grandis** B. P. 388. *P. Mungo* VAR. *melanosperma* H. S. 230.
v. *Krishna mung, kála mung.*
An occasional field crop; native of China.

132. Vigna Savi.

* **Vigna pilosa** Bak.; B. P. 389. *Dolichos pilosus* H. S. 232.
v. *Jhikrai, malkonia.*
Hedges and thickets, rare.

* **Vigna luteola** Benth.; B. P. 389. *Dolichos gangeticus* H. S. 232.
Western Sundribuns on river banks, banks of the Hughli as far north as Uluberia.

Vigna Catjang Endl.; B. P. 389. *Dolichos sinensis* VAR. *orthocarpus* H. S. 232.
v. *Barbati.*
Cultivated everywhere; native of China.
VAR. **sinensis** B. P. 389. *Dolichos sinensis* VAR. *eccremocarpus* H. S. 232.
Cultivated generally; native of China.

133. Pachyrhizus Rich.

Pachyrhizus angulatus Rich.; H. S. 234; B. P. 390.
v. *Sankálu.*
Cultivated generally; sometimes as if wild in village-shrubberies; native of America.

134. Dolichos Linn.

Dolichos Lablab Linn.; B. P. 391. *Lablab cultratum* H. S. 233.

v. *Shim.*

Cultivated everywhere, in many different races; native of Africa.

VAR. **lignosus** B. P. 391. *Lablab vulgare* H. S. 233.

v. *Shim.*

Cultivated everywhere, in several distinct races; native of Africa.

Dolichos biflorus Linn.; B. P. 391. *D. uniflorus* H. S. 232.

v. *Kurti kalai.*

Cultivated sparingly in the Hughli district; native of India.

135. Psophocarpus Neck.

Psophocarpus tetragonolobus DC.; H. S. 234; B. P. 391.

v. *Chari kona shim.*

In native gardens about Calcutta, occasionally; native of Africa.

136. Teramnus Sw.

* **Teramnus labialis** Spreng.; B. P. 393. *Glycine labialis* H. S. 214.

v. *Ban kalai.*

Hedges, thickets and waste places, everywhere.

* **Teramnus debilis** Prain; B. P. 393. *Glycine debilis* H. S. 214.

v. *Masháni.*

Hedges and thickets, general.

137. Canavalia DC.

Canavalia ensiformis DC.; B. P. 394. *C. gladiata* H. S. 234.

v. *Makhan sím.*

Cultivated, in several varieties, generally throughout the Tropics; nowhere really wild.

* **Canavalia virosa** W. & A.; H. S. 235; B. P. 394.

v. *Kath sím, kala sím.*

Hedges and thickets, not common, and not met with in 24-Pergunnahs: if the fruits are not seen this is very easily mistaken for *C. obtusifolia.*

* **Canavalia lineata** DC.; B. P. 394. *C. obtusifolia* H. S. 235.

Western Sundribuns, sea-face in sandy places, rather rare.

* **Canavalia obtusifolia** DC.; B. P. 394. *C. turgida* Grah.

Western Sundribuns, on river banks, very common; also plentiful on the banks of the river Hughli as far north as Calcutta. This is the only wild *Canavalia* at all common in our districts; in literature it is very much confused with *C. lineata*, perhaps from the fact that both are essentially sea-shore plants. In the field it is more often confused with *C. virosa* owing to their great similarity except as regards fruit. The name *C. obtusifolia*, though it *belongs* to this plant, is not particularly appropriate; it would be much more convenient if it were possible to employ Graham's name *C. turgida* which is most suitable to its pods. For *C. lineata*, on the other hand, the name *C. obtusifolia* would, had its use been permissible, have been quite appropriate.

138. **Erythrina** Linn.

* **Erythrina indica** Lamk; H. S. 237; B. P. 398.

v. *Palita mandar.*

Western Sundribuns, along the sea-face, wild; not met with in the swamp forests; often elsewhere in our districts, but only planted as a support for climbing vegetables or as a native hedge.

Erythrina ovalifolia Roxb.; H. S. 237; B. P. 398.

v. *Hari kákra.*

In village-shrubberies, especially to the south of Calcutta and Howrah; probably not wild in our districts; used by the inhabitants as they do the preceding species; native of S. E. Asia and Polynesia.

139. **Mucuna** Adans.

* **Mucuna pruriens** DC.; B. P. 400. *M. pruritus* H. S. 235.

v. *Alkúshi.*

Hedges, thickets and village-shrubberies, everywhere.

The cowhage; pods covered with intolerably stinging hairs.

Mucuna utilis Wall.; H. S. 235; B. P. 400.

v. *Alkúshi, bilati alkúshi, kála khamach.*

In native gardens, often; introduced from Africa; most probably derived originally from *M. pruriens*; but pods only velvety and devoid of stinging hairs.

Mucuna nivea DC.; H. S. 236; B. P. 400.

v. *Khamach.*

In native gardens, everywhere; also most probably derived originally from *M. pruriens*, but evolved in India; pods only velvety and devoid of stinging hairs. In this plant the flowers are white, in *M. pruriens* and *M. utilis* they are dark purple.

140. Butea Roxb.

Butea frondosa Roxb.; H. S. 238; P. B. 401.

v. *Palás.*

Planted occasionally on roadsides and in avenues; given by Voigt as occurring at Serampore but there almost certainly not wild; native of the drier parts of India and Indo-China.

141. Clitoria Linn.

Clitoria Ternatea Linn.; H. S. 213; B. P. 402.

v. *Aparajita.*

In gardens, everywhere, also often self-sown and spontaneous in hedges and thickets; introduced from Malaya.

142. Sesbania Pers.

Sesbania ægyptiaca Pers.; B. P. 403. *S. cegyptiaca* H. S. 216.

v. *Jainti.*

Planted, but only occasionally; native of Africa.

VAR. **picta**; B. P. 403. *S. cegyptiaca* VAR. *concolor* H. S. 216.

Planted generally; native of Africa.

VAR. **bicolor** W. & A.; H. S. 216; B. P. 404.

Planted everywhere, and often spontaneous in village-shrubberies; native of Africa.

* **Sesbania paludosa** Prain; B. P. 404. *Æschynomene paludosa* H. S. 219.

v. *Káth-sola.*

In ditches and marshes, in deep water, during the rainy season everywhere; never cultivated.

Sesbania cannabina Pers.; B. P. 404. *S. aculeata* H. S. 216.

v. *Dhunchi.*

A regular field crop in the rainy season, everywhere; not known wild; possibly evolved from *S. aculeata.*

* **Sesbania aculeata** Pers.; B. P. 404. *S. procumbens* H. S. 216.

Edges of wet rice-fields, general. Voigt has confused this species, which is not uncommon in our districts nominally with the commonly cultivated *S. cannabina,* but really with the not very dissimilar *S. procumbens*; which he gives as occurring at Serampore. *S. procumbens* has never, however, been found anywhere except in the Madras and Bombay Presidencies.

* **Sesbania uliginosa** Sweet; H. S. 216; B. P. 404.

Wet fields, very rare.

Both Roxburgh and Voigt have found this species in our districts; from Roxburgh's figure of the plant it is clearly very different from *S. aculeata*; no one has gathered it since Voigt wrote. Mr. Baker, indeed, unites *S. paludosa* and *S. uliginosa;* the latter is, however, prostrate with stems that measure fewer inches than those of the former, which is erect, do in feet.

Sesbania grandiflora Pers.; B. P. 404. *Agati grandiflora* H. S. 216.

v. *Agati, agasthi.*

Planted everywhere, as a support for climbing vegetables; native of Malaya.

143. Tephrosia Pers.

* **Tephrosia Hookeriana** W. & A.; B. P. 405. *T. villosa* H. S. 215.

Waste places and roadsides, rare.

* **Tephrosia purpurea** Pers.; H. S. 215; B. P. 405.

v. *Sarphonka, ban nil.*

Waste places and roadsides, general.

144. Pongamia Vent.

* **Pongamia glabra** Vent.; H. S. 239; B. P. 407.

v. *Karanja.*

Western Sundribuns; banks of Hughli as far north as Chinsura.

145. Derris Lour.

* **Derris scandens** Benth.; B. P. 408. *Brachypterum scandens.* H. S. 240.

v. *Noa lata.*

Woods and thickets, everywhere.

* **Derris uliginosa** Benth.; B. P. 408. *Pongamia uliginosa* H. S. 239.

v. *Pan lata.*

Western Sundribuns; banks of Hughli as far north as Chinsura.

146. Dalbergia Linn. f.

Dalbergia lanceolaria Linn. f.; B. P. 411. *D. frondosa* H. S 241.

Planted on roadsides and in avenues occasionally.

Dalbergia Sissoo Roxb.; H. S. 241; B. P. 411.

v. *Sisoo.*

Roadsides and avenues, and near villages, often planted; given by Voigt as occurring at Serampore, but not wild though sometimes self-sown in our districts; native of submontane (Himalayan) forests.

Dalbergia latifolia Roxb.; H. S. 240; B. P. 411.

v. *Swet sál, sit sál.*

Occasionally planted on roadsides and in avenues, not infrequently so near villages; given by Voigt as occurring at Serampore, but certainly not wild in our districts; native of India.

* **Dalbergia spinosa** Roxb.; H. S. 241; B. P. 411.

v. *Amanta.*

Western Sundribuns, very plentiful.

* **Dalbergia torta** Grah. *D. candenatensis* B. P. 411.

v. *Panchioli.*

Western Sundribuns.

147. Melilotus Linn.

* **Melilotus indica** All.; B. P. 413. *M. parviflora* H. S. 209.

v. *Ban méthi.*

A field weed in the cold season, everywhere.

* **Melilotus alba** Lamk; B. P. 413. *M. leucantha* H. S. 209.

v. *Safed ban méthi, ban piring.*

A field weed in the cold season, general.

148. Trigonella Linn.

Trigonella Fœnum-græcum Linn.; H. S. 209; B. P. 414.

v. *Méthi, bara méthi.*

In native gardens, occasionally; native of S. Europe.

Trigonella corniculata Linn.; H. S. 209; B. P. 414.

v. *Piring.*

Sometimes cultivated, but usually in our districts only a cold-weather field weed, rare and with no claim to be a native; native of Europe.

149. Arachis Linn.

Arachis hypogæa Linn.; H. S. 243; B. P. 415.

v. *Át ke kalai, mat kalai, belati mung, chiné badam, mung phuli.*

In fields, but not at all commonly cultivated, and only near Calcutta; native of America.

150. Smithia Ait.

* **Smithia sensitiva** Ait.; H. S. 220; B. P. 417.

v. *Nala kashina, kalkashonda.*

In waste places, general.

151. Æschynomene Linn.

* **Æschynomene indica** Linn.; B. P. 418. *A. Roxburghii* H. S. 219.
v. *Sola, bhâth sola.*
In ditches and marshes, everywhere.

* **Æschynomene aspera** Linn.; H. S. 219; B. P. 418.
v. *Bháth sola, phul sola.*
In ditches and marshes, general.

152. Uraria Desv.

* **Uraria picta** Desv.; H. S 220; B. P. 420.
v. *Sankar jata.*
In grassy glades and fields, general.

* **Uraria lagopoides** DC.; B. P. 420. *U. lagopodioides* H. S. 220.
v. *Golak chakúliya, gurkiya chakúlia.*
In grassy open spaces, general.

153. Lourea Neck.

Lourea vespertilionis Desv., H. S. 220; B. P. 421.
v. *Cham chika.*
Sometimes in gardens; occasionally in waste places in our districts; given by Voigt as occurring at Serampore, but with little, if any, claim to be native in our districts; native of S. E. Asia.

154. Desmodium Desv.

* **Desmodium triflorum** DC.; H. S. 223; B. P. 424.
v. *Kudaliya.*
Grassy open places and roadsides, everywhere.

* **Desmodium heterophyllum** DC.; H. S. 223; B. P. 424.
Goghat, Western Hughli district; also Serampore, according to Voigt.

* **Desmodium diffusum** DC.; B. P. 424. *D. elongatum* H. S. 222.
Grassy open places, very rare in our districts, and only west of the river Hughli.

Desmodium pulchellum Benth.; B. P. 424. *Dicerma pulchellum* H. S. 223.
v. *Juta salpani.*
Given by Voigt as occurring at Serampore; not impossibly, but requires verification; native of S. E. Asia.

* **Desmodium umbellatum** DC.; H. S. 221; B. P. 424.
Western Sundribuns.

* **Desmodium Cephalotes** Wall.; H. S. 221; B. P. 424.
Village-shrubberies and hedges, rare in our districts.

* **Desmodium polycarpum** DC.; H. S. 221; B. P. 425.
Waste places; very rare in our districts.

* **Desmodium gangeticum** DC.; H. S. 221; B. P. 425.
v. *Salpani.*
Open glades, dry grassy fields and waste places, everywhere.

* **Desmodium gyrans** DC.; H. S. 222; B. P. 426.
v. *Gora chand, ban charal.*
Grassy glades and waste places, general but nowhere common. The Semaphore Plant.

155. Alysicarpus Neck.

* **Alysicarpus vaginalis** DC.; H. S. 224; B. P. 428.
v. *Kurila.*
Drier grassy glades and fields, general.
VAR. * **nummularifolia** Bak.; B. P. 428.
v. *Kurila.*
Drier grassy glades and fields, everywhere.

* **Alysicarpus bupleurifolius** DC.; H. S. 224; B. P. 428.
Drier grassy glades and fields, general.

* **Alysicarpus rugosus** DC.; B. P. 428.
Drier grassy glades and fields; west of the river Hughli only and not common.
VAR.* **minor** Prain; B. P. 428.
Drier grassy glades; very rare in our districts.

156. Psoralea Linn.

* **Psoralea corylifolia** Linn.; H. S. 211; B. P. 429.
v. *Barachi, hakuchi.*
Waste places, sides of fields, roadsides, everywhere.

157. Cyamopsis DC.

Cyamopsis psoraloides DC.; H. S. 210; B. P. 429.
Occasionally cultivated in our districts, but not a general crop; native of Africa.

158. Indigofera Linn.

* **Indigofera linifolia** Retz; H. S. 211; B. P. 431.
v. *Bhángra.*

Drier grassy glades and fields, roadsides and waste places, everywhere.

* **Indigofera trifoliata** Linn.; B. P. 431.

Waste places, not at all common in our districts, and only west of the river Hughli.

* **Indigofera viscosa** Lamk; H. S. 211; B. P. 432.

Grassy glades and waste places, west of the river Hughli; rare in our districts.

Indigofera trita Linn. f.; H. S. 212; B. P. 432.

Given by Voigt as occurring at Serampore, but almost certainly by mistake; the species occurs in Chota Nagpur but is rare even there; native of the drier parts of India.

159. Cassia Linn.

Cassia Fistula Linn.; B. P. 437. *Cathartocarpus Fistula* H. S. 247.

v. *Amaltás, sonálu, bandar lathi gach.*

In village-shrubberies, planted and self-sown; Western Sundribuns, but only in abandoned settlements; given by Voigt as occurring at Serampore, but hardly wild in our districts; native of S. E. Asia.

Cassia glauca Lamk; H. S. 249; B. P. 437.

In gardens generally; native of India and Indo-China.

Cassia occidentalis Linn.; H. S. 250; B. P. 437.

v. *Kalkashonda.*

In waste places, everywhere; native of America.

* **Cassia Sophera** Linn.; H. S. 248; B. P. 438.

v. *Kalkashonda.*

In waste places, everywhere.

VAR. * **purpurea** Voigt; H. S. 248; B. P. 438.

v. *Lal kalkashonda.*

In waste places; very rare.

Cassia bicapsularis Linn.; H. S. 248; B. P. 438.

In village-shrubberies and waste places, mostly nearly Calcutta; native of America.

Cassia auriculata Linn.; H. S. 250; B. P. 248.

In hedges often, sometimes in village-shrubberies; native of drier parts of India.

* **Cassia Tora** Linn.; H. S. 250; B. P. 438.

v. *Chakúnda.*

In waste places, everywhere.

Cassia alata Linn.; H. S. 249; B. P. 438.

v. *Dád mardán.*

In waste places, occasional; native of America.

Cassia siamea Lamk; B. P. 438.

In avenues, planted everywhere; native of Indo-China and Malaya.

* **Cassia mimosoides** Linn.; B. P. 439. *C. Wallichiana* H. S. 251. *C. angustissima* H. S. 251. *C. Leschenaultiana* H. S. 251. *C. tenella* H. S. 251.

Serampore according to Voigt; not collected by others.

* **Cassia Absus** Linn.; H. S. 251; B. P. 438.

Goghat, Western Hughli district.

160. Bauhinia Linn.

Bauhinia acuminata Linn.; H. S. 253; B. P. 441.

v. *Kanchan.*

Planted in gardens and elsewhere, but often in village-shrubberies and neglected gardens as if wild; native of S. E. Asia generally.

Bauhinia racemosa Lamk; H. S. 253; B. P. 441.

v. *Ban-ráj.*

Given by Voigt as occurring at Serampore, but almost certainly only planted, and very rarely so, anywhere in our districts; native of the drier parts of S. E. Asia.

Bauhinia tomentosa Linn.; H. S. 253; B. P. 441.

A favourite shrub in gardens; occasionally an escape; native of India.

Bauhinia variegata Linn.; H. S. 253; B. P. 442.

v. *Rakto kamhar, swet kanchan,* according to the colour of the flowers, which vary a good deal but are never either entirely red or wholly white: *Swet kanchan* is also termed *kana ráj.*

A favourite tree in gardens; native of India, the Himalayas, and Indo-China.

Bauhinia purpurea Linn.; H. S. 254; B. P. 442. *B. triandra* H. S. 254.

v. *Deva kanchan, koiral.*

Often planted, but also very readily self-sown; native of India and Indo-China.

Bauhinia monandra Kurz; B. P. 442.

Occasionally planted; native of Madagascar.

161. Saraca Linn.

Saraca indica Linn.; B. P. 444. *Jonesia Asoca* H. S. 246.

v. *Asóka.*

Planted in gardens and near temples; occasionally self-sown; native of Indo-China.

Somewhat similar in appearance are *Amherstia nobilis* native of Indo-China, and several species of *Brownea,* American, planted by Europeans in gardens and on lawns, but not met with about villages or near temples.

162. Tamarindus Linn.

Tamarindus indica Linn.; H. S. 247; B. P. 444.

v. *Tintuli, tinturi, imli.*

Planted everywhere about villages and on roadsides; often self-sown; native of Africa.

163. Parkinsonia Linn.

Parkinsonia aculeata Linn.; H. S. 246; B. P. 446.

v. *Belati kikar.*

In native gardens and in village-shrubberies as if wild, everywhere.

164. Poinciana Linn.

Poinciana regia Boj.; H. S. 245; B. P. 446.

Planted on roadsides and in avenues everywhere; introduced from Mauritius.

165. Colvillea Boj.

Colvillea racemosa Boj.; H. S. 245; B. P. 447.

Planted occasionally in avenues; introduced from Mauritius.

166. Cæsalpinia Linn.

* **Cæsalpinia Bonducella** Flem.; B. P. 449. *Guilandina Bonduc* H. S. 244.

v. *Nata karanj.*

Western Sundribuns; village-shrubberies and hedges generally.

* **Cæsalpinia Nuga** Ait.; B. P. 449.

v. *Natua shingri lata.*

Western Sundribuns; plentiful.

Cæsalpinia pulcherrima Sw.; B. P. 449. *Poinciana pulcherrima* H. S. 245.

v. *Krishna chúra.*

In gardens everywhere, also as if wild in neglected gardens and village-shrubberies; native of S. E. Asia.

Cæsalpinia Sappan Linn.; H. S. 244; B. P. 449.
v. *Bakám, patang.*

Planted occasionally in our districts; given by Voigt as occurring at Serampore, but certainly not native; native of S. E. Asia.

Cæsalpinia coriaria Willd.; H. S. 245.
v. *Debi-dibi* (from the American name).

Sometimes planted, but not on a large scale, in our districts; native of West Indies.

Cæsalpinia sepiaria Roxb.; H. S. 245; B. P. 449.

A favourite hedge-plant near villages, especially west of the river Hughli; now often quite naturalized; native of the drier parts of India and Indo-China.

167. **Parkia** R. Br.

Parkia biglandulosa W. & A.; H. S. 257; B. P. 451.

Planted in avenues; native of S. E. Asia.

168. **Neptunia** Lour.

* **Neptunia oleracea** Lour.; B. P. 454. *Desmanthus natans* H. S. 258.
v. *Pani najak.*

In marshes, general.

Neptunia plena Benth.; B. P. 454. *Desmanthus punctatus* H. S. 259.
v. *Belati pani najak.*

In gardens, occasionally; on foreshores of river Hughli near Calcutta and Howrah, naturalized, rare; native of America.

169. **Desmanthus** Willd.

Desmanthus virgatus Willd.; H. S. 258; B. P. 455.

In waste places about Calcutta, rather uncommon, but quite naturalized; native of America.

170. **Mimosa** Linn.

Mimosa pudica Linn.; H. S. 257; B. P. 456.
v. *Najak.*

Roadsides and waste places, everywhere: looks as if a native, but probably originally introduced from America.

* **Mimosa rubricaulis** Lamk; H. S. 257; B. P. 456.
v. *Kuchi kanta, shiah kanta.*

Goghat, western part of Hughli district; also given by Voigt as occurring at Serampore.

171. Acacia Willd.

* **Acacia Suma** Ham.; H. S. 260; B. P. 458.

v. *Sau kanta, shai kanta.*

Hughli district, in village shrubberies, occasional.

* **Acacia catechuoides** Wall. B. P. 458. *A Catechu* H. S. 260. *A. Sundra* H. S. 260.

v. *Khayar.*

In village-shrubberies, general.

Acacia Farnesiana Willd.; B. P. 458. *Vachellia Farnesiana* H. S. 264.

v. *Guhiya bábul.*

Planted very generally; given by Voigt as occurring at Serampore, but certainly not wild in our districts; native of Western India and the Orient.

* **Acacia arabica** Willd.; H. S. 262; B. P. 458.

v. *Bábul.*

In fields and about villages, everywhere; sometimes planted.

* **Acacia tomentosa** Willd.; H. S. 262; B. P. 458.

v. *Salsain bábul.*

In village-shrubberies, general.

Acacia concinna DC.; B. P. 458. *A. rugata* H. S. 263.

v. *Ban rítha, rítha.*

Given by Voigt as occurring at Serampore; but probably only planted, which it occasionally is near villages throughout our districts; native of S. E. Asia.

172. Albizzia Duraz.

Albizzia Lebbek Benth.; B. P. 461. *Acacia Sirissa* H. S. 261.

v. *Sirissa.*

In avenues, on roadsides, and near villages; everywhere planted; native of Sub-Himalayan forests and of Indo-China.

Albizzia procera Benth.; B. P. 461.

v. *Koroi.*

Planted in avenues, now quite naturalized in village-shrubberies near Calcutta; native of drier parts of India and Indo-China.

Albizzia lucida Benth.; B. P. 461.

v. *Síl koroi.*

Planted, but also often self-sown in village-shrubberies near Calcutta; native of lower Himalayan slopes and of moister parts of Indo-China.

173. Leucæna Benth.

Leucæna glauca Benth.; B. P. 455. *Mimosa glauca* H. S. 262.

Hedges, river banks, thickets and village shrubberies, everywhere; native of America.

In Voigt's time only planted in gardens; now one of the commonest shrubs in the neighbourhood of Calcutta.

174. Pithecolobium Mart.

Pithecolobium dulce Benth.; B. P. 462. *Inga dulcis* H. S. 257.

v. *Belati ámli*, *dekhani bábul.*

Planted everywhere, but also self-sown and very plentiful in village-shrubberies; native of America.

In Voigt's time only cultivated; now a very common denizen of village woods, almost as plentiful as *Guazuma tomentosa* : introduced to India by way of the Philippines and Malaya.

175. Enterolobium Mart.

Enterolobium Saman Prain; B. P. 463.

v. *Belati sirissa.*

Planted in avenues and on roadsides, everywhere; occasionally self-sown; native of America. The Rain Tree.

XXXVII.—ROSACEÆ.

176. Rosa Linn.

Rosa involucrata Roxb.; H. S. 194; B. P. 466.

v. *Ban guláb.*

In gardens, not common: not wild apparently within our districts, but plentiful, wild, in marshes in North and East Bengal.

Rosa centifolia Linn.; H. S. 194; B. P. 467.

v. *Basaraiya guláb.*

In gardens, general; native of Europe.

Rosa indica Linn.; H. S. 194; B. P. 467.

v. *Kanta guláb.*

In gardens, everywhere; native of China.

177. Eriobotrya Lindl.

Eriobotrya japonica Lindl.; H. S. 198; B. P. 468.

Cultivated, sparingly, in gardens; native of China. The Loquat.

The Peach is also sparingly cultivated but does not produce fruit so freely as the Loquat.

XXXVIII.—CRASSULACEÆ.

178. Bryophyllum Salisb.

Bryophyllum calycinum Salisb.; H. S. 268; B. P. 470.
v. *Kop-pata.*
In waste places and thickets, everywhere; native of Moluccas, first brought to Calcutta in 1799.

179. Kalanchoë Adans.

* **Kalanchoë laciniata** DC.; H. S. 268; B. P. 471.
v. *Hem ságar.*
Hughli district, in waste places, rare.

XXXIX.—DROSERACEÆ.

180. Drosera Linn.

* **Drosera Burmanni** Vahl; H. S. 79; B. P. 472.
Goghat, Western Hughli district.

181. Aldrovanda Linn.

* **Aldrovanda vesiculosa** Linn.; H. S. 79; B. P. 472.
v. *Malacca jhángi.*
Jhils south of Calcutta, very rare; has been collected by Roxburgh, T. Thomson, and Kurz.

XL.—HALORAGEÆ.

182. Myriophyllum Linn.

* **Myriophyllum tuberculatum** Roxb.; H. S. 35; B. P. 474. *M. verticillatum* H. S. 35, not of Linn.
v. *Jhángi.*
In marshes east of the river Hughli, very common; west of the Hughli, very rare.

* **Myriophyllum indicum** Willd.; H. S. 35; B. P. 474. *M. tetrandrum* H. S. 35.
v. *Jhángi.*
In marshes and ditches; everywhere.

XLI.—RHIZOPHORACEÆ.

183. Rhizophora Linn.

* **Rhizophora mucronata** Lamk; H. S. 41; B. P. 475.
v. *Khamo, bhara.*
Western Sundribuns.

* **Rhizophora conjugata** Linn.; H. S. 41; B. P. 475.
v. *Khamo, bhora.*
Western Sundribuns.

184. Ceriops Arn.

* **Ceriops Roxburghiana** Arn.; H. S. 41; B. P. 476.
v. *Gorán.*
Western Sundribuns.

185. Kandelia W. & A.

* **Kandelia Rheedei** W. & A.; H. S. 41; B. P. 476.
v. *Gória.*
Western Sundribuns.

186. Bruguiera Lamk.

* **Bruguiera gymnorhiza** Lamk; B. P. 477. *B. Rheedei* H. S. 41.
v. *Kankra.*
Western Sundribuns.

Bruguiera parviflora W. & A.; H. S. 41.
Sundribuns, according to Roxburgh and Voigt, but needs confirmation; native of other S. E. Asian shores.

XLII.—COMBRETACEÆ.

187. Terminalia Linn.

Terminalia Catappa Linn.; H. S. 36; B. P. 481.
v. *Deshi badám.*
Planted on roadsides and in avenues; native of Malaya.

188. Lumnitzera Willd.

Lumnitzera racemosa Willd.; H. S. 39; B. P. 484.
v. *Kripa.*
Western Sundribuns.

189. Quisqualis Linn.

Quisqualis indica Linn.; H. S. 39; B. P. 484.
In gardens, everywhere; native of Malaya.

XLIII.—MYRTACEÆ.

190. Psidium Linn.

Psidium Guyava Linn.; B. P. 487. *P. pyriferum* H. S. 46. *P. pomiferum* H. S. 46.
v. *Piyár.*

Planted, and semi-spontaneous in village-shrubberies, everywhere; native of America.

191. Eugenia Linn.

Eugenia malaccensis Linn.; H. S. 47; B. P. 490.

v. *Malacca jamrúl.*

In native gardens, frequent; native of Malaya.

Eugenia javanica Lamk.; *E. alba* H. S. 48.

v. *Jamrúl.*

In native gardens, frequent; native of Malaya. Voigt by an oversight gives the vernacular name as *Amrúl*, which is in our districts, used only for *Oxalis corniculata.*

Eugenia Jambos Linn.; H. S. 47; B. P. 490.

v. *Goláb jámb.*

In native gardens, often; native of India.

Eugenia aquea Roxb.; H. S. 47; B. P. 490.

v. *Jambo.*

In gardens, often; native of Malaya.

Eugenia Jambolana Lamk; H. S. 49; B. P. 491.

v. *Kála jámb, jámb.*

Planted generally, occasionally semi-spontaneous; native of India.

VAR. **caryophyllifolia** B. P. 491. *E caryophyllifolia* H. S. 49.

v. *Chhota jámb.*

Given by Voigt as occurring at Serampore, not impossibly, but needs verification; is plentiful to the west of our districts; native of India.

192. Barrington Forst.

* **Barringtonia racemosa** Bl.; H. S. 51; B. P. 493.

v. *Samundra.*

Western Sundribuns.

* **Barringtonia acutangula** Gærtn.; H. S. 51; B. P. 493.

v. *Hidjal.*

Near river banks, general.

XLIV.—LYTHRACEÆ.

193. Ammannia Linn.

* **Ammannia rotundifolia** Ham.; B. P. 500. *Ameletia rotundifolia* H. S. 130.

Edges of wet rice-fields, sides of ditches; very rare.

* **Ammannia peploides** Spreng.; B. P. 500. *Ameletia indica* H. S. 130.

Edges of wet rice-fields, sides of ditches; frequent.

* **Ammannia pygmæa** Kurz; B. P. 500.

Damp paths and open waste places, general.

* **Ammannia pentandra** Roxb.; B. P. 500. *Rotala Roxburghiana.* H. S. 129.

A weed of wet places; general.

VAR. * **fimbriata** Wight; B. P. 500.

A weed of wet places; general.

* **Ammannia baccifera** Linn.; B. P. 500. *A. vesicatoria* H. S. 130. *A. indica* H. S. 130.

v. *Dád mári.*

A weed of wet places; everywhere.

* **Ammannia salicifolia** Monti; B. P. 501.

v. *Dád mári.*

A weed of wet places; 24-Pergunnahs only.

* **Ammannia multiflora** Roxb.; H. S. 130; B. P. 501.

A weed of wet places, general.

194. **Woodfordia** Salisb.

Woodfordia floribunda Salisb.; B. P. 502. *Grislea tomentosa* H. S. 131.

v. *Dhaí phul, dhás, dhani.*

Given by Voigt as occurring at Serampore, but there certainly only planted; it *may* occur in the extreme west of Hughli district; native of S. E. Asia.

195. **Lawsonia** Linn.

Lawsonia alba Lamk; H. S. 131; B. P. 502.

v. *Mehndi.*

Planted in hedges, chiefly in Hughli district; native of the Orient. The Henna.

196. **Lagerstrœmia** Linn.

Lagerstrœmia indica Linn.; H. S. 131; B. P. 504.

v. *Telinga china.*

In gardens everywhere, in hedges or on lawns; native of S. E. Asia.

Lagerstrœmia Flos-Reginæ Retz; B. P. 504. *L. Reginæ* H. S. 131.

v. *Jarúl.*

Planted on roadsides and in avenues; native of Indo-China and India.

197. Sonneratia Linn. f.

* **Sonneratia apetala** Ham.; H. S. 50; B. P. 505.
v. *Keóra.*
Western Sundribuns and banks of river and creeks as far north as Uluberia and the Salt-lakes of Calcutta.

* **Sonneratia acida** Linn. f.; H. S. 50; B. P. 505.
v. *Óra.*
Western Sundribuns.

198. Punica Linn.

Punica Granatum Linn.; H. S. 50; B. P. 505.
v. *Dalím.*
Occasionally in native gardens about Calcutta; native of Africa. The Pomegranate.

XLV.—ONAGRACEÆ.

199. Jussiæa Linn.

* **Jussiæa repens** Linn.; H. S. 33; B. P. 507.
v. *Kesara-dám.*
Floating on ponds or ditches, or creeping on their muddy margins; everywhere.

* **Jussiæa suffruticosa** Linn.; B. P. 507. *J. villosa* H. S. 33.
v. *Lál banlanga.*
A weed of moist places; general.

200. Ludwigia Linn.

* **Ludwigia parviflora** Roxb.; H. S. 34; B. P. 507.
v. *Banlanga.*
A weed of wet rice-fields, Hughli district.

201. Trapa Linn.

* **Trapa bispinosa** Roxb.; H. S. 35; B. P. 508.
v. *Singhára, pani phál.*
Floating on ponds, everywhere. The Water Chestnut.

XLVI.—TURNERACEÆ.

202. Turnera Linn.

* **Turnera ulmifolia** Linn.; B. P. 511. *T. ulmifolia* VAR. *angustifolia* H. S. 85.

In waste places, everywhere; originally an escape from gardens, but now thoroughly established throughout our districts; native of America.

Voigt gives *T. trioniflora* as similarly domesticated about Serampore, but though there are parts of India, *e.g.* Tenasserim, where this species also is quite naturalized, the writer has never met with it in a wild state in our districts.

XLVII.—PASSIFLORACEÆ.

203. Passiflora Linn.

Passiflora suberosa Linn.; H. S. 80; B. P. 512.

In hedges and thickets throughout our districts; thoroughly naturalized everywhere; native of America.

Passiflora fœtida Linn.; H. S. 81; B. P. 512.

In hedges and thickets about Shibpur, Serampore, Chandernagore, Hughli; apparently quite naturalized; native of America.

Both these species are originally escapes from gardens; both appear to have become domesticated since Voigt's time, but the first of the two, which is now invading the Sundribuns, must certainly be reckoned one of the wild plants of our area. Various other species of *Passiflora* are cultivated; at least two of them have been found by the writer naturalized in hedges and thickets in Northern Bengal and no doubt in time others will establish themselves in our districts, and may, indeed, have already casually done so.

204. Carica Linn.

Carica Papaya Linn.; H. S. 83; B. P. 514.

v. *Pippiya* (from the American name).

Generally cultivated, but often also subspontaneous in village-shrubberies. The Papaw.

XLVIII.—CUCURBITACEÆ.

205. Trichosanthes Linn.

Trichosanthes dioica Roxb.; H. S. 58; B. P. i. 517.

v. *Patal.*

Cultivated and occasionally as if wild in village-shrubberies; native of India.

***Trichosanthes cucumerina** Linn.; H. S. 57; B. P. i. 518. *T. lobata* H. S. 58.

v. *Ban chichinga.*

In hedges and thickets; sometimes also cultivated.

Trichosanthes anguina Linn.; H. S. 57; B. P. i. 518.
v. *Chichinga.*
Cultivated everywhere; native of S. E. Asia.

* **Trichosanthes palmata** Roxb.; B. P. i. 518. *T. bracteata* H. S. 58.
v. *Makal.*
In village-shrubberies and hedges, common.

206. Gymnopetalum Arn.

* **Gymnopetalum cochinchinense** Kurz; B. P. i. 518.
Hedges and thickets near Calcutta; not common.

207. Lagenaria Ser.

Lagenaria vulgaris Ser.; H. S. 57; B. P. i. 519.
v. *Kaddu, kodu, laú.*
Cultivated about villages; sometimes as if wild; native of India.

208. Luffa Cav.

* **Luffa graveolens** Roxb.; H. S. 57; B. P. i. 520.
North-Western Sundribuns, at Jatta.

Luffa ægyptiaca Mill.; B. P. i. 520; *L. pentandra* H. S. 56. *L. clavata* H. S. 57.
v. *Dhundul.*
Cultivated about villages, but often also as if wild; native of Eastern Hemisphere.

Luffa acutangula Roxb.; B. P. i. 520. *L. fœtida* H. S. 56.
v. *Jhinga.*
Cultivated generally, near villages; native of India.

* **Luffa amara** Roxb.; H. S. 57; B. P. i. 520.
v. *Tita-jhinga, tita dhundul.*
Serampore, according to Voigt; not improbably, but the record needs confirmation.

209. Benincasa Savi.

Benincasa cerifera Savi; H. S. 57; B. P. i. 521.
v. *Chal kamra.*
Cultivated generally, near villages; native of S. E. Asia.

210. Momordica Linn.

Momordica Charantia Linn.; H. S. 56; B. P. i. 521.
v. *Karéla.*
Cultivated everywhere; sometimes as if wild in village-shrubberies; native of S. E. Asia.

VAR. **muricata** W. & A.; H. S. 56.
v. *Úchhiya.*
Cultivated everywhere; much more plentiful than the *karéla;* native of S. E. Asia.

* **Momordica dioica** Roxb.; H. S. 56; B. P. i. 521.
In hedges and thickets, everywhere.

* **Momordica cochinchinensis** Spreng.; H. S. 56; B. P. i. 522.
v. *Gol kákra.*
Hedges and thickets, especially about Calcutta.

211. **Cucumis** Linn.

* **Cucumis trigonus** Roxb.; H. S. 59; B. P. i. 522. *C. pubescens.* H. S. 59.
v. *Ban-gamak.*
Waste places, especially west of river Hughli.

Cucumis Melo Linn.; H. S. 58; B. P. i. 522. *C. utilissimus* H. S. 58.
v. *Karbúz* (*C. Melo,* the sweet); *Kákri* (*C. utilissimus,* the vegetable).
Cultivated everywhere; native of the Orient.

Cucumis sativus Linn.; H. S. 58; B. P. i. 523.
v. *Khirá.*
Cultivated about Calcutta; native of the Orient.

212. **Citrullus** Schrad.

Citrullus vulgaris Schrad.; B. P. i. 523. *C. cucurbita* H. S. 55.
v. *Tarbúz.*
Cultivated about Calcutta; native of the Orient.

213. **Cephalandra** Schrad.

* **Cephalandra indica** Naud.; B. P. i. 523. *Coccinia grandis* H. S. 59.
v. *Tela kucha, bhimba.*
Hedges and thickets, everywhere.

214. **Cucurbita** Linn.

Cucurbita Pepo DC.; B. P. i. 524.
v. *Kúmra.*
Cultivated occasionally; native of the Orient.

Cucurbita maxima Duch.; B. P. i. 524.
v. *Mitha kaddu.*
Cultivated occasionally; native of the Orient.

Cucurbita moschata Duch.; B. P. i. 524. *C. maxima* H. S. 59.
v. *Safra kúmra.*
Cultivated fairly generally; native of the Orient.

215. Mukia Arn.

* **Mukia scabrella** Arn.; H. S. 55; B. P. i. 525.
v. *Agu makhi, bilári.*
Hedges, thickets and waste places, everywhere.

216. Bryonia Linn.

* **Bryonia laciniosa** Linn.; H. S. 55; B. P. i. 526.
v. *Mala.*
Village-shrubberies, not common.

217. Zehneria Endl.

* **Zehneria umbellata** Thev.; B. P. i. 527. *Karivia umbellata* H. S. 55.
v. *Kudári, rakhal susa.*
Hedges and thickets, general, but not very common.

XLIX.—CACTACEÆ.

218. Cereus DC.

Cereus pterogonus Lemaire.
Planted as a fence, especially in the Hughli district; occasionally as if wild in waste places, *e.g.* in the Goghat sub-division; native of America.

219. Opuntia Mill.

Opuntia Dillenii Haw.; H. S. 62; B. P. i. 531.
v. *Nág phana.*
In waste places and by roadsides, quite naturalised in many places; native of America.

L.—FICOIDEÆ.

220. Sesuvium Linn.

* **Sesuvium Portulacastrum** Linn.; B. P. i. 532. *S. repens* H. S. 323.
Western Sundribuns, on muddy river banks, general.

221. Trianthema Linn.

* **Trianthema monogynum** Linn.; B. P. i. 533. *T. obcordatum* H. S. 173.
v. *Sabuni; gada-bani.*

Waste places and garden ground, general.

Voigt records also *T. decandrum* from Serampore, but says it is rare; he restricts the name *gada-bani* to *T. decandrum.* The writer has never found any 2-styled species of *Trianthema* in our area and believes that the two vernacular names are applied to *T. monogynum.* There is nothing, however, to prevent the occurrence of both *T. decandrum* and *T. pentandrum* alongside of *T. monogynum* in Lower Bengal and they should be looked for; they are quite like *T. monogynum* but may be at once distinguished by their 2 styles, *T. monogynum* having but 1 style.

Voigt further reports *T. crystallinum* from Serampore, but Clarke in Hooker's *Flora of British India* says that this species does not occur in Bengal: in this it is almost certain that Clarke is right and that Voigt's supposed *T. crystallinum* was only a state of *T. monogynum.*

222. **Mollugo** Linn.

***Mollugo stricta** Linn.; B. P. i. 533. *M. pentaphylla* H. S. 180· *M. triphylla* H. S. 180.
v. *Khét papara, jul papara.*
A weed of river-foreshores and sand-banks.

***Mollugo Spergula** Linn.; H. S. 180; B. P. i. 533.
v. *Ghimi shák.*
A field weed; everywhere, common.

***Mollugo hirta** Thunb.; B. P. i. 533. *Glinus dictamnoides* H. S. 65.
Waste places and dry fields, everywhere.

This appears to have no distinctive vernacular name in spite of its being a common plant; both by Roxburgh and by Voigt, it is quoted simply as *Dusera-sag* or *Dusra-suk,* "another pot-herb."

LI.—UMBELLIFERÆ.

223. **Hydrocotyle** Linn.

***Hydrocotyle rotundifolia** Roxb.; H. S. 20; B. P. i. 535.
A weed of gardens about Calcutta.

***Hydrocotyle asiatica** Linn.; H. S. 20; B. P. i. 535.
v. *Brahma manduki, thalkuri.*
Grassy glades and moist shady places, general.

224. **Carum** Linn.

Carum Roxburghianum Benth.; B. P. i. 536. *Pimpinella involucrata* H. S. 21.
v. *Chanu, rajani, radhani.*
Everywhere cultivated; native of India.

Carum copticum Benth.; B. P. i. 536. *Ptychotis, Ajowan* H. S. 21.
v. *Juráni, buro-jowán.*
Everywhere cultivated; native of India.

225. **Fœniculum** Adans.

Fœniculum vulgare Gærtn.; H. S. 22; B. P. i. 537. *F. Panmori* H. S. 22.
v. *Pan mohuri.*
Sparingly cultivated, mostly in Hughli district; native of the Orient.

226. **Seseli** Linn.

* **Seseli indicum** W. & A.; B. P. i. 538. *Cnidium diffusum* H. S. 22.
v. *Ban jowán.*
A field weed, occasional only.

227. **Œnanthe** Linn.

* **Œnanthe stolonifera** Wall.; H. S. 21; B. P. i. 539.
v. *Pan turási.*
In and around ponds and ditches, general.

* **Œnanthe benghalensis** Benth.; B. P. i. 539. *Dasyloma bengalense* H. S. 22.
Moist shady spots near water, common.

228. **Peucedanum** Linn.

Peucedanum Sowa Kurz; B. P. i. 540. *Anethum Sowa* H. S. 22.
v. *Salpha, sowa.*
Cultivated generally; native of India.

229. **Coriandrum** Linn.

Coriandrum sativum Linn.; H. S. 23; B. P. i. 540.
v. *Dhané.*
Cultivated sparingly, especially in the Hughli district; native of the Orient.

230. **Daucus** Linn.

Daucus Carota Linn.; H. S. 23; B. P. i. 541.
v. *Gájar.*
Cultivated occasionally; native of Europe and the Orient.

LII.—ARALIACEÆ.

231. **Panax** Linn.

Panax fruticosum Linn.; H. S. 24; B. P. i. 543.
In gardens generally; native of Malaya.

LIII.—CORNACEÆ.

232. **Alangium** Lamk.

* **Alangium Lamarckii** Thw.; B. P. i. 543. *A. decapetalum* H. S. 40.
v. *Ankúra.*
In village-shrubberies, general.

COROLLIFLORÆ.

LIV.—RUBIACEÆ.

233. **Anthocephalus** A. Rich.

Anthocephalus Cadamba Miq.; B. P. i. 551. *Nauclea Cadamba* H. S. 375.
v. *Kadam.*
Planted in avenues, on roadsides and near villages; sometimes spontaneous in village-shrubberies; native of S. E. Asia.

234. **Adina** Salisb.

Adina cordifolia Hook. f.; B. P. i. 552. *Nauclea cordifolia* H. S. 375.
v. *Káli kadam, da kóm, petpuria, bangka.*
Planted occasionally on roadsides and about village tanks; native of drier parts of India and Indo-China.

235. **Stephegyne** Korth.

* **Stephegyne parvifolia** Korth.; B. P. i. 552. *Nauclea parvifolia* H. S. 375.
Hughli district, Goghat sub-division, wild; also reported by Voigt from Serampore but there probably only planted, as it occasionally is in other places west of the Hughli.

236. **Wendlandia** Bartl.

* **Wendlandia exserta** DC.; H. S. 383; B. P. i. 554.
v. *Chilkiya.*
Hughli district, Goghat sub-division, wild.

237. **Dentella** Forst.

* **Dentella repens** Forst.; H. S. 383; B. P. i. 555.
v. *Bhumi pát.*
Damp foot-paths and shady places, general.

238. **Oldenlandia** Linn.

* **Oldenlandia crystallina** Roxb.; B. P. i. 559. *Hedyotis pumila* H. S. 384.
v. *Panki.*
Waste places, general.

* **Oldenlandia diffusa** Roxb.; B. P. i. 559. *Hedyotis dichotoma* H. S. 384.
Waste places and thickets, general.

* **Oldenlandia corymbosa** Linn.; B. P. i. 559. *Hedyotis Burmanniana* H. S. 384.
v. *Khet pápra.*
Waste places, not uncommon.

* **Oldenlandia paniculata** Linn.; B. P. i. 560. *Hedyotis racemosa* H. S. 384.
v. *Gándha bhaduli.*
Edges of rice-fields and moist places, general.

239. **Hamelia** Jacq.

Hamelia patens Jacq.; H. S. 385; B. P. i. 563.
In gardens and on lawns; also now often sub-spontaneous near villages about Calcutta; native of America.

240. **Gardenia** Linn.

Gardenia florida Linn.; H. S. 377; B. P. i. 565.
v. *Gándha ráj.*
In gardens everywhere; native of China.

241. **Randia** Linn.

Randia uliginosa DC.; H. S. 381; B. P. i. 566.
v. *Pirálo.*
Planted occasionally; given by Voigt as occurring at Serampore, but almost certainly not wild anywhere in our districts; native of India and common in West Bengal beyond our limits.

* **Randia dumetorum** Lamk; H. S. 381; B. P. i. 567.
v. *Menphúl, madan.*
Hughli district, Goghat sub-division, wild; Western Sundribuns, in old cleanings, naturalized; sometimes also in native gardens, planted.

242. **Hyptianthera** W. & A.

* **Hyptianthera stricta** W. & A.; H. S. 382; B. P. i. 568.
In thickets, west of the river Hughli; rare.

243. **Pavetta** Linn.

Pavetta indica Linn.; H. S. 391; B. P. i. 569.
v. *Kukur chúra.*

Reported by Voigt as occurring at Serampore, but almost certainly only planted, as it sometimes is elsewhere.

VAR. * **tomentosa** B. P. i. 570. *Pavetta tomentosa* H. S. 392.
v. *Jui.*

Hedges, village-shrubberies and waste places, general.

244. **Ixora** Linn.

* **Ixora parviflora** Vahl; H S. 390; B. P. i. 571.
v. *Gandhal rangan.*

Hughli district, Goghat sub-division, in waste places; elsewhere general in village-shrubberies.

* **Ixora undulata** Roxb.; H. S. 390; B. P. i. 571.
v. *Palaka jui.*

In village-shrubberies, general.

Ixora coccinea Linn. VAR. **Bandhuca**; B. P. i. 571. *I. Bandhuca* H. S. 389
v. *Rangan.*

In gardens and on lawns, everywhere; native of India and Indo-China.

Ixora stricta Roxb.; H. S. 389; B. P. i. 571.
In gardens, generally; native of China.

245. **Coffea** Linn.

Coffea bengalensis Roxb.; H. S. 392; B. P. i. 572.

Recorded by Voigt from Serampore, but almost certainly not wild in our districts; plentiful in Chota Nagpur.

246. **Morinda** Linn.

* **Morinda bracteata** Roxb.; H. S. 386; B. P. i. 573. *M. exserta* H. S. 386.
v. *Haldi kúnch, ronch, hardi, ban ách.*

Western Sundribuns and along the banks of the Hughli as far north as Calcutta; occasionally also in village-shrubberies near the river.

* **Morinda citrifolia** Linn.; H. S. 385; B. P. i. 573. *M. tinctoria?* H. S. 386.

v. *Ách.*

Goghat sub-division, Hughli district. *M. tinctoria* is reported by Voigt from Serampore, but this record is doubtful; possibly *M. citrifolia* may have been the species seen; in any case it was probably only planted.

247. Canthium Lamk.

Canthium parvifolium Roxb.; H. S. 388; B. P. i. 574.

Village-shrubberies, but only near Calcutta and only occasionally: this was introduced from Chittagong in 1814 and had not flowered up to 1845; it is interesting to find it now becoming naturalized.

248. Vangueria Juss.

Vangueria edulis Vahl; H. S. 386; B. P. i. 575.

Cultivated occasionally in native gardens; introduced from Madagascar.

* **Vangueria spinosa** Roxb.; H. S. 386; B. P. i. 575.

v. *Moyena.*

In village-shrubberies, not uncommon.

249. Pæderia Linn.

* **Pæderia fœtida** Linn.; H. S. 388; B. P. i. 578.

v. *Gándha bhadulia.*

Hedges and thickets, general.

250. Knoxia Linn.

Knoxia corymbosa Willd.; H. S. 395; B. P. i. 578.

Reported from Serampore by Voigt; the record requires verification.

251. Spermacoce Linn.

* **Spermacoce hispida** Linn.; H. S. 394; B. P. i. 580.

Waste places, but only west of the Hughli river; not uncommon.

LV.—COMPOSITÆ.

252. Centratherum Cass.

* **Centratherum anthelminticum** O. Kuntze; B. P. i. 589. *Vernonia anthelmintica* H. S. 405.

v. *Somráj.*

Rubbish heaps, rare, possibly not truly native of our area; plentiful to the west of our districts.

253. **Vernonia** Schreb.

* **Vernonia cinerea** Less.; H. S. 405; B. P. i. 590.
v. *Kok-shim, kála jhira.*
Fields, roadsides and waste places, everywhere.

254. **Elephantopus** Linn.

* **Elephantopus scaber** Linn.; H. S. 406; B. P. i. 590.
v. *Samdulun.*
Waste places, open glades and dry fields, general.

255. **Adenostemma** Forst.

* **Adenostemma viscosum** Forst.; B. P. i. 591. *A. leiocarpum* H. S. 406.
v. *Búro keshuti.*
Waste places and rubbish heaps, occasional.

256. **Ageratum** Linn.

Ageratum conyzoides Linn.; H. S. 406; B. P. i. 591.
v. *Oochunti.*
Fields, open glades, waste places, everywhere; originally American.

257. **Eupatorium** Linn.

Eupatorium Ayapana Vent.; B. P. i. 592. *E. triplinerve* H. S. 407.
v. *Ayapana* (from its American name).
Commonly cultivated in native gardens about Calcutta; native of Brazil.

Eupatorium odoratum Linn.; B. P. i. 592.
Occasionally in native gardens about Calcutta; introduced from West Indies.

258. **Cyathocline** Cass.

* **Cyathocline lyrata** Cass.; B. P. i. 593.
Hughli district, Goghat sub-division, in waste places.

259. **Grangea** Forsk.

* **Grangea maderaspatana** Poir.; H. S. 409; B. P. i. 593.
v. *Namúti.*
Roadsides, dry fields and waste places, general.

260. **Blumea** DC.

* **Blumea amplectens** DC.; B. P. i. 597.
Moist fields east of the Hughli and south of Calcutta, also in cleanings in the North-Western Sundribuns.

* **Blumea bifoliata** DC.; H. S. 410; B. P. i. 597.

Dry grassy places and hedges, mostly about Calcutta, Howrah, and other towns near the Hughli.

* **Blumea Wightiana** DC.; B. P. i. 597.

Drier grassy glades, everywhere.

* **Blumea glomerata** DC.; B. P. i. 598.

Waste places, occasional only and possibly not truly native in our districts; plentiful in most parts of Bengal.

* **Blumea lacera** DC.; H. S. 410; B. P. i. 598.

v. *Kukur sunga, bara koksing, buro kukshim, bara suksunga.*

Drier grassy glades, general.

* **Blumea laciniata** DC.; H. S. 410; B. P. i. 598.

Drier grassy glades, especially west of the river Hughli.

* **Blumea membranacea** DC.; B. P. i. 598. *Conysa diffusa* H. S. 409.

Grassy places, everywhere.

261. Laggera Sch.-Bip.

* **Laggera flava** Benth.; B. P. i. 599.

Dry grassy places, but only west of the Hughli river, and rare in our districts.

* **Laggera aurita** Sch.-Bip.; B. P. i. 599. *Blumea aurita* H. S. 410.

Dry fields, roadsides, hedges, general.

262. Pluchea Cass.

* **Pluchea indica** Less.; H. S. 410; B. P. i. 600.

v. *Munjhu rukha, kukronda.*

Western Sundribuns, plentiful.

263. Sphæranthus Linn.

* **Sphæranthus africanus** Linn.; B. P. i. 601. *S. hirtus* H. S. 409.

v. *Mundi.*

Swampy places and rice-fields especially south of Calcutta and in cleanings in the North-Western Sundribuns; very rare west of the Hughli.

* **Sphæranthus indicus** Linn.; B. P. i. 601. *S. mollis* H. S. 409.

v. *Chaggul nadi, ghák-nundi, murmuria.*

Dry rice-fields, very plentiful west of the river Hughli; east of the river rather rare.

264. Athroisma DC.

* **Athroisma laciniatum** DC.; B. P. i. 601.

Dry rice-fields, occasional.

265. Gnaphalium Linn.

* **Gnaphalium luteo-album** Linn. VAR. **pallidum** B. P. i. 602.
Dry fields west of the Hughli and north of Calcutta.

* **Gnaphalium indicum** Linn.; H. S. 421; B. P. i. 602.
Dry fields, gardens, and places where water has lodged during the rains, general.

* **Gnaphalium pulvinatum** DC.; B. P. i. 603.
Hughli district, Goghat sub-division.

266. Cæsulia Roxb.

* **Cæsulia axillaris** Roxb.; H. S. 411; B. P. i. 603.
Rice-fields and wet places, everywhere.

267. Emilia Cass.

* **Emilia sonchifolia** DC.; H. S. 421; B. P. i. 605.
v. *Sadi modi.*
Shady places, general.

268. Hymenantherum Cass.

Hymenantherum tenuifolium Cass.
In gardens general, readily self-sown on dry paths and in dry waste places; native of Mexico.

269. Tagetes Linn.

Tagetes patula Linn.; H. S. 416; B. P. i. 607.
v. *Chhota genda.*
In gardens everywhere, often also as an escape; native of Mexico.

Tagetes erecta Linn.; H. S. 417.
v. *Buro genda.*
In gardens generally, sometimes also as an escape; native of Mexico.

270. Xanthium Linn.

* **Xanthium strumarium** Linn.; B. P. i. 607. *X. orientale* H. S. 413.
v. *Ban okra, chhota gokhru.*
River banks, sides of ponds and ditches, waste places and rubbish heaps, general.

Xanthium spinosum Linn.; B. P. i. 608.
Waste places, occasional; very abundant at Canning Town along the Matla river; introduced from S. Europe.

271. Lagascea Cav.

Lagascea mollis Cav.; H. S. 406; B. P. i. 608.

Garden ground, waste places and river banks about Calcutta, a very frequent weed; introduced from the West Indies.

272. Zinnia Linn.

Zinnia pauciflora Linn.; H. S. 413; B. P. i. 609.

In gardens everywhere; sometimes also sub-spontaneous; native of Mexico.

Other species of *Zinnia*, and especially *Z. elegans*, are generally cultivated in gardens both Native and European, but the writer has not observed this tendency to become naturalised in any save *Z. pauciflora*.

273. Enhydra Lour.

***Enhydra fluctuans** Lour.; B. P. i. 610. *E. Hingcha* H. S. 416.
v. *Hingcha.*

Edges of ponds and ditches and sometimes partly floating; everywhere.

274. Eclipta Linn.

***Eclipta alba** Hassk.; B. P. i. 610. *E. erecta* H. S. 411.
v. *Kesari, keshuti.*

Fields, roadsides, waste places everywhere.

275. Wedelia Jacq.

***Wedelia calendulacea** Less.; H. S 414; B. P. i. 611.
v. *Kesaráj, bhimráj.*

Wet places, banks of ponds, ditches and khals; general.

***Wedelia scandens** Clarke; B. P. i. 612. *Wollastonia scandens* H. S. 414.
v. *Bhimráj.*

Western Sundribuns, climbing on bushes along river banks and at sea-face, very common; extends along banks of Hughli almost to Calcutta.

276. Tithonia Desf.

Tithonia tagetiflora Desf.; B. P. i. 612.

In gardens and on lawns, general; native of America.

277. Helianthus Linn.

Helianthus annuus Linn.; H. S. 415; B. P. 613.
v. *Suraj mukhi, shuriya mukti.*

In gardens everywhere; native of S. America.

Helianthus argyrophyllus Torr. & Gr.; B. P. i. 613.
v. *Safed suraj mukhi, swet shuriya mukti.*

In gardens generally, and freely sub-spontaneous in cultivated ground and waste places; native of N. America.

Helianthus tuberosus Linn.; H. S. 415; B. P. i. 613.
v. *Brahmokha.*

In vegetable and market gardens, especially near Calcutta; native of Brazil.

278. Guizotia Cass.

Guizotia abyssinica Cass.; H. S. 414; B. P. i. 614.
v. *Surgûja, ram tila.*

A field crop in Goghat sub-division of Hughli district; native of Africa.

279. Synedrella Gærtn.

Synedrella nodiflora Gærtn.; B. P. i. 615.

In cultivated ground and waste places about Calcutta; occasional; native of tropical America.

280. Cosmos Cav.

Cosmos sulfureus Cav.; H. S. 416; B. P. i. 616.

In gardens; also not infrequent as a weed in waste places near Calcutta (quite naturalised in the drier districts to the west of our area); native of Mexico.

281. Spilanthes Linn.

Spilanthes Acmella Linn.; H. S. 416; B. P. i. 614.
v. *Marhata tiga.*

Reported by Voigt from Serampore, but the record requires verification; the species occurs in Chota Nagpur, North Bengal, and Chittagong, but is probably only a casual on the deltaic alluvium.

282. Galinsoga Ruiz & Pav.

Galinsoga parviflora Cav.; B. P. i. 618.

A not uncommon weed in cultivated ground in the cold weather but not persisting; probably always a casual introduction from the Himalaya where it is abundant; originally introduced from America.

283. Tridax Linn.

Tridax procumbens Linn.; H. S. 417; B. P. i. 618.

Grassy glades, dry roadsides, old walls, everywhere; native of Mexico.

284. Chrysanthemum Linn.

Chrysanthemum coronarium Linn.; B. P. i. 619. *C. Roxburghii* H. S. 419.
v. *Gúl-dandi.*
Reported by Voigt from Serampore, but possibly only from Carey's Garden; it is a staple cold-weather crop in Northern Bengal and the Assam Valley, but is not grown in Central Bengal; native certainly of China and, it is said, also of the Mediterranean region. Voigt refers the vernacular name only to the garden *Chrysanthemum* (*C. indicum*) which is also a native of China, introduced to general horticulture by way of Japan.

285. Cotula Linn.

* **Cotula hemisphærica** Wall.; B. P. i. 620. *Machlis hemispherica* H. S. 420.
A weed of cultivated ground and waste places, west of the river Hughli.

286. Centipeda Lour.

* **Centipeda orbicularis** Lour.; B. P. i. 620. *Myriogyne minuta* VAR. *lanuginosa* H. S. 420.
v. *Mechitta, hachuti.*
Damp ground, everywhere.

287. Cnicus Linn.

* **Cnicus arvensis** Hoffm.; B. P. i. 622. *Aplotaxis cirsioides* H. S. 424.
v. *Tikbhuma, silkánta.*
Cultivated ground, everywhere.

288. Silybum Gærtn.

Silybum Marianum Gærtn.; H. S. 425; B P. i. 623.
In gardens, mostly, however, of European residents; native of the Mediterranean region, the Orient and the Western Himalaya.

289. Carthamus Linn.

Carthamus tinctorius Linn.; H. S. 425; B. P. i. 625.
v. *Kusumb.*
A cold-weather field crop, general; native of India.

290. Crepis Linn.

* **Crepis japonica** Benth.; B. P. i. 627. *Youngia procumbens* H. S 432 (not *Prenanthes procumbens* Roxb.)
Hedges, waste places, margins of partially dried ponds, general.

* **Crepis acaulis** Hook. f.; B. P. i. 627. *Youngia acaulis* H. S. 432. *Y. linifolia* H. S. 432.
Waste places, margins of paths, west of river Hughli, rare.

291. Lactuca Linn.

Lactuca sativa Linn.; H. S. 430; B. P. i. 628.
v. *Káhú, salád.*
In vegetable and market gardens about Calcutta and other towns.

292. Sonchus Linn.

* **Sonchus asper** Vill.; B. P. i. 629. *S. ciliatus* H. S. 432.
In fields and waste places, quite common.

Sonchus oleraceus Linn.; B. P. i. 629.
In gardens an occasional weed; native of Europe.

Sonchus arvensis Linn.; B. P. i. 629. *S. orixensis* H. S. 432.
v. *Ban palang.*
In gardens and waste places, rather rare. This in the writer's experience is the rarest of the three Sow-thistles that are to be met with in our area; it is common in various parts of India but can hardly be considered a native of these districts.

293. Launea Cass.

* **Launea aspleniifolia** Hook. f.; B. P. i. 630. *Microrhynchus asplenifolius* H. S. 431.
v. *Tik-chana.*
In grassy glades and open fields, everywhere.

* **Launea pinnatifida** Cass.; B. P. i. 630.
Western Sundribuns, creeping on sand at the sea-face.

LVII.—CAMPANULACEÆ.

294. Lobelia Linn.

Lobelia trigona Roxb.; B. P. i. 633. *L. triangulata* H. S. 367.
Reported by Voigt from Serampore; quite possibly, but the record requires confirmation; native of India, common in wet pastures in Western Bengal.

295. Sphenoclea Gærtn.

* **Sphenoclea zeylanica** Gærtn.; B. P. i. 635. *Pongatium indicum* H. S. 371.
v. *Jhil mirich.*
Edges of pools and ditches and rice-fields, general.

296. Wahlenbergia Schrad.

* **Wahlenbergia gracilis** DC.; B. P. i. 636. *W. dehiscens* H. S. 369.

Dry fields west of the river Hughli, general, but not anywhere common; has been collected near Shibpur (*Kurz*), Serampore (*Voigt*), and Chandernagore (*Prain*).

LVI.—STYLIDEÆ.

297. Stylidium Sw.

* **Stylidium tenellum** Sw.; H. S. 372; B. P. i. 631.

Ditches about Serampore (*Voigt*); should be looked for again as it has not been collected, since Voigt's record, in our districts.

LVIII.—PLUMBAGINEÆ.

298. Ægialitis R. Br.

* **Ægialitis rotundifolia** Roxb.; H. S. 439; B. P. i. 638.

v. *Sátári.*

Western Sundribuns, plentiful.

299. Plumbago Linn.

Plumbago zeylanica Linn.; H. S. 438; B. P. i. 639.

v. *Chita, chitra.*

In gardens; also occasionally as a weed in waste places but with no claim to be a native of our districts; native of S. E. Asia.

Plumbago rosea Linn.; H. S. 439; B. P. i. 639.

v. *Rakto-chita, Rakto-chitra.*

In gardens, generally, also sometimes as a weed in waste places; native of S. E. Asia.

LIX.—PRIMULACEÆ.

300. Androsace Linn.

* **Androsace saxifragæfolia** Bunge; B. P. i. 640.

Sides of moat round Fort William.

This was once collected by Dr. T. Anderson, but has not been met with again in our districts.

301. Anagallis Tournef.

Anagallis arvensis Linn.; H. S. 335; B. P. i. 641.

A cold-weather weed of fields and gardens near Calcutta; generally to be met with if looked for, but always very rare, and apparently not persisting, so that it probably has no claims to be a native of our districts. Only the blue-flowered form, characteristic of Upper India, is to be found; possibly it is annually re-introduced with up-country seed.

LX.—MYRSINEÆ.

302. Ardisia Sw.

* **Ardisia humilis** Vahl.; H. S. 337; B. P. i. 645.
v. *Ban jám.*
Village shrubberies, chiefly east of the river Hughli.

303. Ægiceras Gærtn.

* **Ægiceras majus** Gærtn.; B. P. i. 645. *A. fragrans* H. S. 336.
v. *Halsi, khalsi, koilsha.*
Western Sundribuns, common; salt-lakes near Calcutta.

LXI.—SAPOTACEÆ.

304. Achras Linn.

Achras Sapota Linn.; H. S. 339; B. P. i. 648.
v. *Sapota* (the American name adapted).
Cultivated in orchards about Calcutta; native of S. America.

305. Mimusops Linn.

Mimusops Elengi Linn.; H. S. 341; B. P. i. 649.
v. *Bakul.*
Planted generally near villages, occasionally also self-sown; native of S. E. Asia.

LXII.—EBENACEÆ.

306. Diospyros Linn.

* **Diospyros Embryopteris** Pers.; H. S. 345; B. P. i. 653.
v. *Gáb.*
Village-shrubberies general; also in Western Sundribuns, *e.g.* at Jatta.

* **Diospyros cordifolia** Roxb.; H. S. 344. *D. montana* VAR. *cordifolia* B. P. i. 653.
v. *Ban gáb.*
Village-shrubberies, general; also in Western Sundribuns, *e.g.* at Jatta.

Diospyros Kaki Linn. f.; H. S. 345; B. P. i. 653.
In gardens and orchards; native of China.

Diospyros discolor Willd.; H. S. 345; B. P. i. 654.
In gardens, occasionally; native of the Philippines.

LXIII.—OLEACEÆ.

307. Jasminum Linn.

* **Jasminum pubescens** Willd.; H. S. 550; B. P. i. 659.
v. *Kundá.*

Goghat sub-division, Hughli district; also reported by Voigt from Serampore, but this last record needs confirmation.

Jasminum Sambac Ait.; H. S. 549; B. P. i. 659.
v. *Bél, ban mallika.*

In gardens generally; occasionally in village-shrubberies; native of the Orient.

Jasminum auriculatum Vahl; H. S. 551; B. P. i. 659.
v. *Jui, jut'hi.*
In gardens occasionally; native of India.

Jasminum elongatum Vahl; H. S. 550. *J. Roxburghianum* H. S. i. 658, partly.

Reported by Roxburgh from Hidguli, and reported by Voigt from the Sundribuns; is a plant that should be looked in the southern part of our districts.

308. Nyctanthes Linn.

Nyctanthes Arbor-tristis Linn.; H. S. 552; B. P. i. 660.
v. *Singhar, septalika.*

Sometimes planted about tanks and near villages; native of India.

LXIV.—SALVADORACEÆ.

309. Azima Lamk.

* **Azima tetracantha** Lamk.; B. P. i. 663. *Monetia tetracantha* H. S. 348.
v. *Trikanta gati.*

Western Sundribuns (*Prain*); Serampore (*Voigt*); Chandernagore and Hughli (*Prain*).

LXV.—APOCYNACEÆ.

310. Allamanda Linn.

Allamanda cathartica Linn.; H. S. 528; B. P. ii. 667.
v. *Har-kakra.*
In gardens generally; introduced from Guiana.

311. Carissa Linn.

Carissa Carandas Linn.; H. S. 529; B. P. ii. 668.
v. *Karamcha.*
In gardens, and sometimes sub-spontaneous in village-shrubberies; native of S. E. Asia.

Carissa spinarum A. DC.; B. P. ii. 669. *C. diffusa* H. S. 529.
Reported by Voigt from the Sundribuns, but this is very doubtful; there are no specimens from our area at Calcutta; the species is very common in the western parts of Bengal.

312. Thevetia Juss.

Thevetia neriifolia Juss.; H. S. 531; B. P. ii. 669.
v. *Kokla phul, haldi korubi.*
In gardens everywhere, but also often sub-spontaneous in village-shrubberies and now occasionally found also in waste places; has been found as if wild even in the Goghat sub-division of the Hughli district; native of tropical America.

313. Cerbera Linn.

* **Cerbera Odollam** Gærtn.; H. S. 531; B. P. ii. 670.
v. *Dákúr.*
Western Sundribuns, on river banks, common.

314. Plumeria Linn.

Plumeria acutifolia Poir. B. P. ii. 670. *P. acuminata* H. S. 528.
v. *Gorur champa, goburiya champa.*
Planted everywhere about villages and near temples but shows little tendency to appear spontaneously; native of S. America.

315. Rauwolfia Linn.

* **Rauwolfia serpentina** Benth.; B. P. ii. 671. *Ophioxylon serpentinum* H. S. 532.
v. *Chandrá, chhota chand.*
Shady groves, general; but doubtfully a native of our districts.

Rauwolfia canescens Linn.; H. S. 532; B. P. ii. 671.

In gardens, also quite naturalized in village-shrubberies and, at least about Calcutta, commoner than the preceding species; native of the West Indies.

316. Kopsia Bl.

Kopsia fruticosa A. DC.; B. P. ii. 671. *Calpicarpum Roxburghii* H. S. 531.

In gardens and on lawns, often; native of Tenasserim and the Andamans.

317. Vinca Linn.

Vinca rosea Linn.; H. S. 526; B. P. ii. 672.

v. *Gul feringhi.*

In gardens and near shrines and temples everywhere; also often sub-spontaneous on rubbish heaps; native of West Indies.

318. Alstonia R. Br.

Alstonia scholaris R. Br.; H. S. 525; B. P. ii. 672.

v. *Chhattin:*

Reported by Voigt from Serampore, but in our districts is almost certainly only planted; it is, however, wild in Western Bengal.

Alstonia macrophylla Wall.; H. S. 526.

Occasionally planted, and about Calcutta and Howrah also appearing spontaneously in village thickets; native of Malaya and one of the few Malayan species that show a tendency to become naturalized in Lower Bengal.

319. Tabernæmontana Linn.

Tabernæmontana coronaria R. Br.; H. S. 527; B. P. ii. 673.

v. *Vagúr.*

In gardens everywhere; but sometimes also sub-spontaneous, *e.g.* at Mátla; native of India.

320. Holarrhena R. Br.

* **Holarrhena antidysenterica** Wall.; H. S. 524; B. P. ii. 674.

v. *Kurchi.*

Goghat, Western Hughli district.

321. Wrightia R. Br.

Wrightia coccinea Sims; H. S. 526; B. P. ii. 674.

In gardens, general.

322. Vallaris Burm.

* **Vallaris Heynei** Spreng.; B. P. ii. 675. *V. dichotoma* H. S. 524.
v. *Hápar mali.*
Village-shrubberies; apparently quite entitled to be considered native, though it is sometimes also found in gardens.

Vallaris Pergulana Burm.; H. S. 524; B. P. ii. 675.
In gardens, occasionally; native of S. E. Asia.

323. Parsonsia R. Br.

* **Parsonsia spiralis** Wall.; H. S. 524; B. P. ii. 676.
Western Sundribuns.

324. Nerium Linn.

Nerium odorum Soland.; H. S. 524; B. P. ii. 676.
v. *Karabi.*
In gardens everywhere; native of China.

325. Roupellia Wall.

Roupellia grata Wall.; B. P. ii. 677.
In gardens and on lawns, rather common; native of Madagascar.

326. Beaumontia Wall.

Beaumontia grandiflora Wall.; H. S. 524; B. P. ii. 678.
Grown on trellises and porches in gardens about Calcutta; native of Eastern Himalaya and Indo-China.

327. Ichnocarpus R. Br.

* **Ichnocarpus frutescens** R. Br.; H. S. 523; B. P. ii. 680.
v. *Siama lata.*
Hedges, thickets and waste places, everywhere.

LXVI.—ASCLEPIADACEÆ.

328. Cryptostegia R. Br.

Cryptostegia grandiflora R. Br.; H. S. 544; B. P. ii. 684.
In gardens, general; native of Madagascar.

329. Cryptolepis R. Br.

* **Cryptolepis Buchanani** R. & S.; B. P. ii. 683. *C. reticulata* H. S. 544.
v. *Karanta.*
Hedges and village-shrubberies, general.

330. **Hemidesmus** R. Br.

* **Hemidesmus indicus** R. Br.; H. S. 544; B. P. ii. 686.
v. *Ananta mul.*
Hedges, thickets and waste places, everywhere.

331. **Finlaysonia** Wall.

* **Finlaysonia obovata** Wall.; B. P. ii. 686. *Gurua obovata* H. S. 544.
v. *Dudhi-lata.*
Western Sundribuns.

332. **Oxystelma** R. Br.

* **Oxystelma esculentum** R. Br.; H. S. 541; B. P. ii. 683.
v. *Kirni.*
Waste places, general but never common.

333. **Calotropis** R. Br.

* **Calotropis gigantea** R. Br.; H. S. 540; B. P. ii. 688.
v. *Ákanda, gurtakand.*
Roadsides and waste places, everywhere.

334. **Asclepias** Linn.

Asclepias Curassavica Linn.; H. S. 539; B. P. ii. 689.
Waste places near villages, everywhere ; native of America.

335. **Cynanchum** Linn.

* **Cynanchum Callialata** Ham.; B. P. ii. 690. *C. pauciflorum* H. S. 541.
v. *Chagulbati.*
Hedges and thickets, general.

336. **Pentatropis** R. Br.

* **Pentatropis microphylla** W. & A.; H. S. 540; B. P. ii. 601.
Hedges and thickets or banks of khals and rivers, from Calcutta salt-lakes southwards.

337. **Dæmia** R. Br.

* **Dæmia extensa** R. Br.; H. S. 541; B. P. ii. 692.
v. *Chagul-bati.*
Hedges and thickets, everywhere.

338. **Sarcostemma** R. Br.

Sarcostemma brevistigma Wight; B. P. ii. 692. *S. acida* H. S. 542.
v. *Soma lata.*

Reported by Voigt to have been once obtained by Dr. Carey at Serampore; probably only a casual in our districts: it is wild in South-West Chota Nagpur (Singbhum).

339. Sarcolobus R. Br.

* **Sarcolobus globosus** Wall.; H. S. 538; B. P. ii. 693.
v. *Baoli-lata.*
Western Sundribuns.

* **Sarcolobus carinatus** Wall.; H. S. 538; B. P. ii. 693.
v. *Baoli-lata.*
Western Sundribuns.

340. Gymnema R. Br.

Gymnema hirsutum W. & A.; B. P. ii. 694. *G. sylvestre* H. S. 538.
v. *Chhoto dudhi lata.*
Reported by Voigt from Serampore and should be looked for; it is common in Behar and Chota Nagpur.

341. Pergularia Linn.

* **Pergularia pallida** W. & A.; H. S. 538; B. P. ii. 696.
Goghat, Western Hughli district in low jungles; reported also by Voigt from Serampore, this last recorded locality needs confirmation.

Pergularia minor Andr.; H. S. 537; B. P. ii. 697. *P. odoratissima* H. S. 537.
v. *Kanja lata.*
In gardens, generally; reported by Voigt from Serampore but probably there only sub-spontaneous; native of S. E. Asia.

342. Dregea E. Mey.

* **Dregea volubilis** Benth.; B. P. ii. 697. *Hoya viridiflora* H. S. 537.
v. *Tita-kunga.*
Hedges and thickets, general.

343. Tylophora R. Br.

* **Tylophora tenuis** Bl.; B. P. ii. 698. *T. tenuissima* H. S. 539.
Hedges, thickets and banks of creeks, from salt-lakes near Calcutta southwards.

* **Tylophora asthmatica** W. & A.; B. P. ii. 698. *T. vomitoria* H. S. 539.
v. *Anta-mal.*
Waste places and hedges, general.

344. **Hoya** R. Br.

* **Hoya parasitica** Wall.; B. P. ii. 700. *H. pallida* H. S. 536.
v. *Pargátcha.*
Western Sundribuns.

LXVII.—LOGANIACEÆ.

345. **Mitrasacme** Labill.

* **Mitrasacme alsinoides** R. Br.; B. P. ii. 702.
Waste places, Goghat, Western Hughli.

LXVIII.—GENTIANACEÆ.

346. **Exacum** Linn.

* **Exacum tetragonum** Roxb.; H. S. 520; B. P. ii. 706.
v. *Kuchári.*
Wet meadows, occasional.

Exacum pedunculatum Linn.; H. S. 520; B. P. ii. 706.
Reported by Voigt from Serampore, but the record needs verification; is found in Behar and Chota Nagpur.

347. **Erythræa** L. C. Rich.

* **Erythræa Roxburghii** G. Don; B. P. ii. 707. *E. centaurioides* H. S. 520.
v. *Gima, girmi.*
Grassy places, occasional.

348. **Hoppea** Willd.

* **Hoppea dichotoma** Willd.; B. P. ii. 707. *Canscora ? pusilla* H. S. 520.
Damp meadows and drying rice-fields, everywhere.

349. **Canscora** Lamk.

* **Canscora diffusa** R. Br.; H. S. 520; B. P. ii. 708.
Grassy places and sides of paths, everywhere.

* **Canscora decussata** R. & S.; H. S. 520; B. P. ii. 708.
v. *Dánkuni.*
Grassy places, paths and waste ground, everywhere.

350. Enicostema Bl.

Enicostema littorale Bl. *Slevogtia verticillata* H. S. 320.
v. *Chhota-kirata.*

Reported by Voigt from Serampore and should therefore be looked for; the record is not a very probable one, and no other botanist has ever reported the species from Bengal.

351. Limnanthemum S. P. Gmel.

* **Limnanthemum cristatum** Griseb.; B. P. ii. 709. *Villarsia cristata* H. S. 321.
v. *Pan-chuli, chand malla, chhota pan chuli.*
Floating on ponds and jhils, everywhere.

* **Limnanthemum indicum** Thw.; B. P. ii. 709. *Villarsia indica* H. S. 321.
v. *Pan-chuli, chand malla, bara pan chuli.*
Floating on ponds and jhils, everywhere.

LXIX.—POLEMONIACEÆ.

352. Phlox Linn.

Phlox Drummondi Hook.; B. P. ii. 710.

In gardens in the cold weather; occasionally sub-spontaneous on rubbishy places near Calcutta, but only the white-flowered kinds, so far as the writer's observations go, and not every year: native of Texas. It may be noted that, though now so general a favourite, this species, according to Voigt, had not been introduced up to 1845.

LXX.—HYDROPHYLLACEÆ.

353. Hydrolea Linn.

* **Hydrolea zeylanica** Vahl.; H. S. 566; B. P. ii. 711.
v. *Kasschra* or (*fide* Voigt) *kankra.*
Marshy places and edges of rice-fields, general.

LXXI.—BORAGINEÆ.

354. Cordia Linn.

* **Cordia Myxa** Linn.; H. S. 440; B. P. ii. 714.
v. *Bohnari, lashora.*
In hedges and village-shrubberies, but sometimes also planted.

Cordia Sebestena Linn.; H. S. 440; B. P. ii. 714.
In gardens; native of West Indies.

355. Ehretia Linn.

Ehretia lævis Roxb.; H. S. 445; B. P. ii. 718.

Reported by Voigt from Serampore, but the record needs confirmation; is common everywhere west of our districts.

356. Heliotropium Linn.

* **Heliotropium ovalifolium** Forsk.; B. P. ii. 716. *H. coromandelianum* H. S. 444.

v. *Naga phuli.*

Goghat, Western Hughli; reported also from Serampore by Voigt.

* **Heliotropium strigosum** Willd. VAR. **brevifolia** B. P. ii. 716. *H. brevifolium* H. S. 445.

v. *Chiti phuli.*

Dry fields and waste places, principally west of the Hughli.

* **Heliotropium indicum** Linn.; B. P. ii. 716. *Tiaridium indicum* H. S. 445.

v. *Hati sura.*

Rubbish heaps and waste places, everywhere.

Voigt records *H. curassavicum* as naturalised about Serampore prior to 1843, it does not appear to have persisted.

357. Coldenia Linn.

* **Coldenia procumbens** Linn.; H. S. 445; B. P. ii. 718.

v. *Triphunki.*

Dry rice-fields, everywhere.

358. Bothriospermum Barge.

Bothriospermum tenellum F. & M.; B. P. ii. 719. *Cynoglossum diffusum* H. S. 443.

Reported by Voigt from Serampore; quite possibly, but the record needs confirmation; plentiful in E. Bengal.

359. Cynoglossum Linn.

* **Cynoglossum lanceolatum** Forsk.; B. P. ii. 719. *C. canescens* H. S. 443.

Waste places, especially about Calcutta.

360. Trichodesma R. Br.

* **Trichodesma indicum** R. Br.; H. S. 444; B. P. ii. 720.

v. *Chhoto kulpa,*

Fields and waste places, everywhere.

Trichodesma zeylanicum R. Br.; H. S. 444; B. P. ii. 720.
v. *Buro kulpa.*

Reported by Voigt from Serampore, but the record needs confirmation; it is wild throughout the drier parts of India and Ceylon.

LXXII.—CONVOLVULACEÆ.

361. Cuscuta Linn.

* **Cuscuta reflexa** Roxb.; H. S. 349; B. P. ii. 723.
v. *Haldi algusi.*

Parasitic on trees and shrubs, everywhere; attaches itself to very many species.

Cuscuta chinensis Lamk. *C. sulcata* H. S. 349.

Reported by Voigt from Serampore; also reported by Roxburgh as occurring on *Amarantus oleraceus*, etc.; not at all improbably, but the record needs verification; occurs in Chota Nagpur.

Cuscuta capitata Roxb.; H. S. 349.
v. *Algusi.*

Reported by Roxburgh as occurring on *Crotalaria juncea*, also by Voigt as appearing at Serampore on the same species; probably only a casual introduced also with seed of *Çan* from outside Bengal; occurs throughout the North-West Himalaya.

Cuscuta europæa Linn. *C. aggregata* H. S. 349.

Roxburgh records this as having once appeared on *Flax* the seeds of which were imported from Bagdad; no doubt a mere casual; native of the Orient, Central Asia, and Europe.

362. Porana Burm.

Porana paniculata Roxb.; H. S. 363; B. P. ii. 724.

In gardens on trellises or on trees; native of India.

363. Cressa Linn.

* **Cressa cretica** Linn.; B. P. ii. 725. *C. indica* H. S. 363.

Salt-lakes near Calcutta, in dried up muddy places.

364. Evolvulus Linn.

* **Evolvulus alsinoides** Linn.; H. S. 363; B. P. ii. 725.

Dry grassy places west of the Hughli.

Evolvulus nummularius Linn.; B. P. ii. 726.

Grassy glades around Calcutta, Howrah, etc., quite naturalised; a recent introduction from the West Indies.

365. Hewittia W. & A.

Hewittia bicolor W. & A.; H. S. 362; B. P. ii. 727.

v. *Jarad-kalmi.*

Recorded from Serampore by Voigt; quite possibly, but requires to be verified; native of India.

366. Jacquemontia Choisy.

Jacquemontia cœrulea Choisy; B. P. ii. 728.

In gardens generally; native of Africa.

367. Merremia Dennst.

Merremia umbellata Hallier f.; B. P. ii. 730. *Ipomœa platanifolia* H. S. 359.

A form of this species not distinguishable from the American variety of the plant, VAR. **occidentalis**, has been reported by Voigt from Serampore and met with by Kurz climbing on bushes on the banks of the Hughli, near Calcutta, probably, however, only as an escape from cultivation that has not persisted, for there is no recent gathering of the plant; the Indian variety, VAR. **orientalis**=*Ipomœa cymosa* (H. S. 358) has not been found in our districts.

* **Merremia vitifolia** Hallier f.; B. P. ii. 730. *Ipomœa vitifolia* H. S. 361.

Occasionally in village-shrubberies.

Merremia tridentata Hallier f.; B. P. ii. 730. *Ipomœa tridentata* H. S. 356.

Reported by Voigt from Serampore, but the record requires confirmation; common in Western Bengal and Behar.

Merremia hastata Hallier f.; B. P, ii, 730. *Ipomœa filiformis* H. S. 356.

Reported by Voigt from Serampore, but the record is not very probable; nearest authentic locality Orissa.

* **Merremia chryseides** Hallier, f.; B. P, ii. 730. *Ipomœa dentata* H. S. 359.

Banks of the Hughli, below Calcutta, rare; Serampore, according to Voigt; perhaps only an escape in our districts; native of Eastern Asia.

* **Merremia convolvulacea** Dennst. *M. hederacea* B. P. ii. 730.

Sundribuns.

* **Merremia emarginata** Hallier f.; B. P. ii. 730. *Ipomœa gangetica* H. S. 356.

v. *Bhui kamri.*

In grassy glades and open sandy places, everywhere.

368. Operculina Manso.

Operculina Turpethum Manso ; B. P. ii. 731. *Ipomœa Turpethum* H. S. 357.
v. *Tohri, dudh-kalmi.*
Hedges, thickets and river banks, general.

369. Ipomœa Linn.

Ipomœa hispida R. & S. ; H. S. 357 ; B. P. ii. 734.

Reported by Voigt from Serampore, and found by the writer at Shibpur, but by the latter only in plots where seeds from Central or Upper India had been sown ; the species is probably not entitled to rank as a native of our districts ; it is not uncommon in the drier parts of India.

* **Ipomœa Pes-tigridis** Linn. ; H. S. 361 ; B. P. ii. 734.
v. *Kanguli lata.*
Occasional in hedges and thickets.

Ipomœa Learii Paxt. ; B. P. ii. 734.
In gardens, on trellises, general.

Ipomœa Nil Roth. ; B. P. ii. 734. *Pharbitis Nil* H. S. 354.
v. *Nil kalmi.*

In gardens everywhere and occasionally in waste places as if wild ; cosmopolitan now in the Tropics, but true native place uncertain.

Ipomœa purpurea Lamk. ; B. P. ii. 735. *Pharbitis purpurea* H. S. 354.
In gardens generally ; native of S. America.

* **Ipomœa paniculata** R. Br. ; B. P. ii. 735. *Batatas paniculata* H. S. 353.
v. *Bilai kand, bhui kumra.*
Hedges and thickets everywhere.

Ipomœa Batatas Lamk ; B. P. ii. 735. *Batatas edulis* H. S. 353.
v. *Mita álu, shakarkand.*

Cultivated generally in gardens and market gardens ; native of America.

* **Ipomœa Pes-Capræ** Sw. ; H. S. 356 ; B. P. ii. 736.
v. *Chhagal kuri.*
Western Sundribuns on sandy shores.

* **Ipomœa reptans** Poir. ; H. S. 355 ; B. P. ii. 736.
v. *Kalmi sák.*
In ponds and marshes, everywhere.

* **Ipomœa sepiaria** Koen.; B. P. ii. 736. *Ipomæa striata* H. S. 358. *I. stipulacea* H. S. 359.

v. *Ban kalmi.*

Hedges, thickets and waste places, everywhere, in two not very distinct forms or varieties.

* **Ipomœa obscura** Ker; H. S. 359; B. P. ii. 736.

Hedges, thickets and waste places, general.

Ipomœa tricolor Cav.; B. P. ii. 736.

In gardens generally, on trellises; native of Mexico.

Ipomœa pulchella Roxb.; B. P. ii. 737. *I. heptaphylla* H. S. 360.

In gardens on trellises, general; native of India and Indo-China.

870. Quamoclit Mœnch.

Quamoclit phœnicea Choisy; H. S. 353; B. P. ii. 737.

In waste places, general, sometimes also in gardens; originally doubtless a garden escape but now completely naturalised; native of America.

Quamoclit pinnata Boj.; H. S. 353; B. P. ii. 738.

v. *Taru-lata, kan-lata.*

In gardens everywhere; sometimes also in waste places as an escape; native of America.

871. Calonyction Choisy.

* **Calonyction Bona nox** Boj.; B. P. ii. 738. *C. Roxburghii* H. S. 355.

v. *Dudh kalmi, dal kalmi.*

In hedges and village-shrubberies, everywhere; occasionally, but very rarely, cultivated. This species is so general that it appears to have a good claim to be considered a native.

872. Rivea Choisy.

Rivea hypocrateriformis Choisy; B. P. ii. 739. *R. Bona nox* H. S. 351.

v. *Kalmi lata.*

Reported by Voigt from Serampore, but the record is not very probable; nearest known locality Midnapore.

873. Stictocardia Hallier. f.

* **Stictocardia tiliæfolia** Hallier f.; B. P. ii. 740. *Rivea tiliæfolia* H. S. 350.

Banks of Hughli river, Salt-lakes, Sundribuns.

374. **Argyreia** Lour.

* **Argyreia speciosa** Sw.; H. S. 351; B. P. ii. 741.
v. *Bich tarak, guguli.*
In village-shrubberies, occasional.

* **Argyreia argentea** Choisy; H. S. 352; B. P. ii. 741.
v. *Chhota bich-tarak.*
Serampore, *Voigt*; Chandernagore, *Prain's collector;* Hughli, *Prain.* Apparently very rare in our area.

375. **Lettsomia** Roxb.

* **Lettsomia strigosa** Roxb.; B. P. ii. 742. *Argyreia capitata* H. S. 352.
In village-shrubberies and hedges.

LXXIII.—SOLANACEÆ.

376. **Lycopersicum** Mill.

Lycopersicum esculentum Mill.; H. S. 513; B. P. ii. 743.
v. *Gur-bagun.*
Cultivated and sometimes on rubbish heaps as an escape; native of America.

377. **Solanum** Linn.

Solanum tuberosum Linn.; H. S. 510; B. P. ii. 745.
v. *Bilati alu.*
Cultivated, especially in Hughli district.

* **Solanum nigrum** Linn.; B. P. ii. 745. *S. rubrum* H. S. 511.
v. *Gurki, gurkamai.*
Shady places, garden ground and waste spots; general.

* **Solanum verbascifolium** Linn.; H. S. 511; B. P. ii. 746.
v. *Arasa.*
Village-shrubberies, roadsides and waste places; general.

Solanum glaucum Dun.
Naturalised and very abundant at Canning Town; native of America.

Solanum sisymbriifolium Lamk.; B. P. ii. 746.
Occasionally as if wild about Shibpur and on the banks of the river Hughli; native of America.

* **Solanum ferox** Linn.; H. S. 512; B. P. ii. 746.
v. *Ram-begun.*
Waste places, not very common.

* **Solanum torvum** Sw.; H. S. 511; B. P. ii. 746.
v. *Gota begun.*
Village-shrubberies, roadsides and waste places; everywhere,

* **Solanum indicum** Linn.; H. S. 512; B. P. ii. 746.
v. *Byakur.*
Waste places near villages, general.

Solanum Melongena Linn.; H. S. 512; B. P. ii. 746.
v. *Begun.*
In gardens and market gardens, everywhere.
VAR. **esculenta** H. S. 512; B. P. ii. 746.
v. *Kuli begun.*
In gardens and market gardens, everywhere.
VAR. **insana** H. S. 512; B. P. ii. 746.
In village-shrubberies and waste places, general. This is rather a state of the cultivated *Begun* become general after escape than a truly wild stock; native of India.

* **Solanum xanthocarpum** Schr. & Wendl.; B. P. ii. 746. *S. Jacquini* H. S. 513.
v. *Kantee kari.*
Waste places and dry fields, everywhere.

* **Solanum trilobatum** Linn.; H. S. 513; B. P. ii. 747.
Western Sundribuns.

378. Capsicum Linn.

Capsicum annuum Linn. VAR. **abbreviata**; B. P. ii. 748. *C. frutescens* H. S. 510.
v. *Lanka mirich.*
In fields and market gardens, everywhere; native of America.
VAR. **grossa** B. P. ii. 748. *C. grossum* H. S. 510.
v. *Kápkari mirich.*
In gardens of natives and Europeans, general; native of America.

Capsicum frutescens Linn.; B. P. ii. 749. *C. fastigiatum* H. S 510.
v. *Dhan mirich.*
In gardens occasionally; as if wild in waste places, general; native of S. America.

379. Physalis Linn.

* **Physalis minima** Linn.; H. S. 514; B. P. ii. 759.
v. *Ban-tipariya.*
A weed of garden ground, everywhere.

Physalis peruviana Linn.; H. S. 514; B. P. ii. 750.
v. *Tipariya.*
In gardens and market gardens, general; native of S. America.

380. Withania Paug.

Withania somnifera Dun.; B. P. ii. 750. *Physalis somnifera* H. S. 513.
v. *Ashva gandha.*
Reported from Serampore by Voigt, but almost certainly not wild; it is cultivated in small gardens in Northern Bengal and may perhaps be met with in our provinces in the gardens of native herbalists; native of Western India.

381. Datura Linn.

Datura fastuosa Linn.; H. S. 515; B. P. ii. 751.
v. *Kala Dhutra.*
In gardens generally, sometimes as if wild; native of India.
VAR. **alba** B. P. ii. 751. *D. alba*, H. S. 515.
v *Dhutra.*
In gardens everywhere, and in waste places, as if wild, generally; native of India.

382. Petunia Juss.

Petunia nyctaginiflora Juss.; H. S. 516.
In gardens of Europeans; occasionally sub-spontaneous in garden beds and on rubbish heaps.

383. Nicotiana Linn.

Nicotiana rustica Linn.; H. S. 516; B. P. ii. 752.
v. *Hamaku, angrezi tamaku.*
Cultivated sparingly in fields; native of America.

Nicotiana Tabacum Linn.; H. S. 516; B. P. ii. 752.
v. *Tamaku.*
In fields, fairly generally; native of America.

Nicotiana plumbaginifolia Viv.; H. S. 516; B. P. ii. 752.
v. *Ban tamaku.*
A weed of shady places, general; native of America.

384. Browallia Linn.

Browallia elata Linn.; H. S. 500; B. P. ii. 753.
In gardens of Europeans, general, but often also occurring spontaneously in garden beds and on rubbish heaps.

LXXIV.—SCROPHULARINEÆ.

385. Celsia Linn.

* **Celsia coromandeliana** Vahl.; H. S. 497; B. P. ii. 757.
v. *Koksima.*
A weed of fields and gardens, general.

386. Linaria Juss

* **Linaria ramosissima** Wall.; H. S. 498; B. P. ii. 757.
Waste places, west of the Hughli, rare.

387. Mazus Lour.

* **Mazus rugosus** Lour.; B. P. ii. 759.

In grassy glades and on garden paths about Calcutta, not very common, and possibly an introduction from elsewhere, not recorded by Voigt though it was known previously to Roxburgh.

388. Lindenbergia Lehm.

* **Lindenbergia urticifolia** Lehm.; B. P. ii. 760. *L. ruderalis* H. S. 501.
v. *Haldi basanta.*
Old walls and sloping banks, everywhere.

389. Limnophila R. Br.

Limnophila Roxburghii G. Don.; H. S. 502; B. P. ii. 763.
v. *Kala karpur.*

In native gardens occasionally; recorded from Serampore by Voigt but very doubtfully wild in our area; is wild in Chota Nagpur and North Bengal.

* **Limnophila conferta** Benth.; B. P. ii. 764.
Damp places, occasional.

Limnophila diffusa Benth.; B. P. ii. 764. *L. albiflora* H. S. 502.
Damp places, occasional.

* **Limnophila erecta** Benth.

Serampore, *Griffith.* Not referred to either by Roxburgh or by Voigt, but once collected at Serampore by Griffith. The species is plentiful in Tenasserim and the Malay Peninsula, and it may have been only as a casual, introduced with plants from Southern Burma or Malaya to Dr. Carey's garden, that Griffith met with it.

* **Limnophila heterophylla** Benth.; H. S. 502; B. P. ii. 764.
Rice-fields and swampy places, general.

* **Limnophila gratissima** Bl.; B. P. ii. 764.
Western Sundribuns at Jatta, in a sweet water tank.

* **Limnophila racemosa** Benth.; H. S. 502; B. P. ii. 764.
Rice-fields and swamps, occasional.

* **Limnophila gratioloides** R. Br.; H. S. 502; B. P. ii. 764. *L. gratioloides* VAR. *myriophylloides* H. S. 502.
v. *Karpur.*
Rice-fields, swamps and damp places everywhere.

390. Herpestis Gærtn. f.

* **Herpestis Monnieria** H. B. & K.; H. S. 502; B. P. ii. 765.
v. *Adha birni.*
Marshes, rice-field borders, and wet places everywhere.

Herpestis chamædroides Linn.; B. P. ii. 765.

A fairly common weed of garden paths about Calcutta; a quite recent introduction from America.

Herpestis Hamiltoniana Benth.; B. P. ii. 765. *H. sessiliflora* H.S. 502.

Reported by Voigt from Serampore, quite a probable record as the species occurs both to the west and to the east of our districts; the record for this area, however, requires verification.

391. Dopatrium Ham.

* **Dopatrium junceum** Ham.; (H. S. 503); B. P. 766. *D. nudicaule* H. S. 503.
Rice-fields and swamps, mostly west of the Hughli.

Voigt in H. S. appears to have reversed the incidence of the two names cited confining *D. junceum* to Coromandel and recording *D. nudicaule* from Bengal. The experience of all subsequent collectors has been that it is *D. junceum* which occurs in our districts.

392. Torenia Linn.

Torenia cordifolia Roxb.; H. S. 505; B. P. ii. 767.

Reported from Serampore by Voigt, but certainly not a native of our districts, though it may quite possibly have been met with by him as a casual, introduced with seeds from other parts of India; native of the higher parts of India and of the lower Himalayan spurs.

Torenia asiatica Linn.; H. S. 505.

Reported from Serampore by Voigt, but certainly not a native of our districts. From his citations it would appear that Voigt refers to two other species, *T. vagans* and *T. peduncularis* and not to the true *T. asiatica* at all. But in any case the plant he refers to can only have occurred as an escape from cultivation (if he means the true *T. asiatica*) or as possibly a casual (if he means either of the others). All three occur both in India and in Malaya.

Torenia Fournieri Linden; B. P. ii. 757.

In gardens of European residents, general; but also coming up spontaneously on rubbish heaps and in waste ground; native of Cochin-China.

This plant shows every sign of becoming quite domesticated in our districts; none of the Indian or Malayan species.

393. Vandellia Linn.

* **Vandellia crustacea** Benth.; H. S. 504; B. P. ii. 768. *V. varians* H. S. 505.

Fields, gardens and paths, everywhere.

* **Vandellia multiflora** G. Don; B. P. ii. 768.

A field and garden weed, general.

* **Vandellia pedunculata** Benth.; B. P. ii. 769. *V. Roxburghii* H. S. 504.

Damp places and rice-fields, occasional.

* **Vandellia angustifolia** Benth.; B. P. ii. 769.

Rice-fields in Western Hughli district, rare.

* **Vandellia pyxidaria** Maxim.; B. P. ii. 769. *Bonnaya integrifolia* H. S. 504.

Gardens, fields and path-ways, everywhere.

394. Ilysanthes Raf.

* **Ilysanthes parviflora** Benth.; B. P. ii. 769. *Bonnaya parviflora* H. S. 504.

Rice-fields, west of the Hughli, occasional.

Ilysanthes hyssopoides Benth.; B. P. ii. 1277. *Bonnaya hyssopoides* H. S. 504.

Recorded by Voigt from Serampore, but not a likely record; the nearest known localities are Silhet and Southern Chota Nagpur; possibly it was the preceding species that Voigt met with.

Ilysanthes rotundifolia Benth. *Bonnaya rotundifolia* H. S. 504.

Recorded by Voigt from Serampore, but a less likely record than the preceding, as the species is apparently confined to Southern India and Ceylon, Mauritius and Madagascar.

Voigt does not report *I. parviflora* from Bengal though that species does certainly occur in our area.

395. Bonnaya Link & Otto.

* **Bonnaya brachiata** Link & Otto; B. P. ii. 770. *B. serrata* H. S. 503.
v. *Bhumi nim.*
A weed of fields, gardens and path-ways.

* **Bonnaya veronicæfolia** Spreng.; H. S. 503; B. P. ii. 770.
Wet places, everywhere.
VAR. * **verbenæfolia** B. P. ii. 770. *B. verbenæfolia* H. S. 503.
Wet places, general.
VAR. * **grandiflora** B. P. ii. 771. *B. grandiflora* H. S. 504.
Fields, gardens and path-ways, everywhere.

* **Bonnaya tenuifolia** Spreng.; H. S. 504; B. P. ii. 771.
Wet places, occasional.

Bonnaya oppositifolia Spreng.; H. S. 504.
Reported by Voigt from Serampore, but the record is very doubtful, since the species is apparently confined to the Deccan.

396. Scoparia Linn.

Scoparia dulcis Linn.; H. S. 507; B. P. ii. 772.
Fields, paths and waste places everywhere; not mentioned by Roxburgh though now one of the commonest and most troublesome of weeds; native of America.

397. Veronica Linn.

Veronica Anagallis Linn.; H. S. 507; B. P. ii. 773.
Reported from the banks of the Hughli about Serampore by Voigt, a very probable record but one that should be confirmed; the species is quite plentiful in North Bengal.

Veronica agrestis Linn.; H. S. 507; B. P. ii. 773.
An occasional weed in gardens about Calcutta in the cold season; probably, however, only a casual and always reintroduced with seed from Upper India or from Europe.

398. Striga Lour.

* **Striga lutea** Lour.; H. S. 505; B. P. ii. 775.
Goghat, Western Hughli district.

* **Striga euphrasioides** Benth.; H. S. 506; B. P. ii. 775.
Goghat, Western Hughli district.

399. **Centranthera** R. Br.

* **Centranthera hispida** R. Br.; H. S. 507; B. P. ii. 776.

Goghat, Western Hughli district; also recorded by Voigt from Serampore.

* **Centranthera humifusa** Wall.; H. S. 508; B. P. ii. 776.

Goghat, Western Hughli district; also recorded by Voigt from Serampore.

LXXV.—OROBANCHACEÆ.

400. **Æginetia** Linn.

* **Æginetia pedunculata** Wall.; H. S. 496; B. P. ii. 778. *Orobanche acaulis* H. S. 496.

On roots of grasses at Shibpur (*Roxburgh*) and Serampore (*Voigt*); probably, however, only casual in our area: is common in Northern Bengal.

401. **Orobanche** Tournef.

* **Orobanche indica** Ham.; H. S. 496; B. P. ii. 779.

On roots of Brassica, occasional.

LXXVI.—LENTIBULARIACEÆ.

402. **Utricularia** Linn.

* **Utricularia stellaris** Linn. f.; H. S. 494; B. P. ii. 780.

v. *Jhangi*

Floating in pools and marshes, general.

VAR. **reflexa** B. P. ii. 780.

Floating in pools and marshes, general.

* **Utricularia flexuosa** Vahl; B. P. ii. 780. *U. fasciculata* H. S. 494.

v. *Jhangi.*

Floating in pools and marshes, everywhere.

* **Utricularia exoleta** R. Br.; B. P. ii. 781. *U. diantha* H. S. 494.

v. *Chhota jhangi.*

Marshes, ditches and wet places, occasional.

Utricularia reticulata Sw. VAR. **uliginosa** B P. ii. 781. *U. reticulata* H. S. 494.

v. *Nil jhangi.*

Reported by Voigt from Serampore; the record needs confirmation but is a quite probable one; the species occurs in Burdwan.

Utricularia racemosa Wall.; B. P. ii. 781. *U. nivea* also *U. nivea* VAR. *cærulea* H. S. 494.

Both varieties of this species are recorded from Serampore by Voigt, but both records need verification; the blue-flowered variety is common in Chota Nagpur and West Bengal, the white flowered one also occurs there.

* **Utricularia bifida** Linn.; B. P. ii. 781.
v. *Chhota jhangi.*
Rice-fields near Hughli, and possibly elsewhere.

LXXVII.—BIGNONIACEÆ.

403. Oroxylum Vent.

Oroxylum indicum Vent.; B. P. ii. 787. *Calosanthes indica* H. S. 477.
Occasionally planted and sometimes self-sown about Calcutta; native of India.

404. Millingtonia Linn. f.

Millingtonia hortensis Linn. f.; B. P. ii. 783. *Bignonia suberosa* H. S. 476.
In avenues, general, sometimes sub-spontaneous; native of Burma.

LXXVIII.—PEDALINEÆ.

405. Martynia Linn.

Martynia diandra Glox.; H. S. 475; B. P. ii. 791.
v. *Bagh noki.*
In waste places and on rubbish heaps not uncommon; native of America.

406. Sesamum Linn.

Sesamum indicum. DC.; H. S. 475; B. P. ii. 792.
v. *Til.*
A field crop; probably native of Asia.

LXXIX.—ACANTHACEÆ.

407. Thunbergia Linn. f.

Thunbergia alata Boj.; H. S. 481; B. P. ii. 795.
In gardens, but occasionally as if wild on rubbish heaps near Calcutta.

Thunbergia grandiflora Roxb.; H. S. 481; B. P. ii. 796.
v. *Nil lata.*
Recorded by Voigt from Serampore; occasionally as if wild in age-shrubberies near Calcutta, but probably only as an escape

from gardens in our area; often grown on trellises; nearest locality where wild, Western Bengal.

408. Nelsonia R. Br.

* **Nelsonia campestris** R. Br.; B. P. ii. 797. *N. tomentosa* H. S. 482.
v. *Parámul.*
Grassy glades, general.

409. Ebermaiera Nees.

* **Ebermaiera glutinosa** Wall.; B. P. ii. 798.
A weed of rice-fields, general.

410. Cardanthera Ham.

* **Cardanthera triflora** Ham.; H. S. 482; B. P. ii. 799.
v. *Kala.*
A weed of wet places and margin of ponds and ditches, general.

411. Acanthus Linn.

* **Acanthus ilicifolius** Linn.; B. P. ii. 800. *Dilivaria ilicifolia* H. S. 487.
v. *Harkuch kanta, hargoza.*
Sundribuns, and banks of Hughli as far north as Calcutta.

* **Acanthus volubilis** Wall.; B. P. ii. 800.
Western Sundribuns.

412. Hygrophila R. Br.

* **Hygrophila polysperma** T. And.; B. P. ii. 801. *Hemiadelphia polysperma* H. S. 483.
v. *Chhota mechitta.*
Dampish spots, general.

* **Hygrophila quadrivalvis** Nees; B. P. ii. 802.
Moist places, general.

* **Hygrophila phlomoides** Nees VAR. **Roxburghii** B. P. ii. 802. *H. obovata* H. S. 483.
Western Sundribuns, in wet swampy places in cleanings, rare elsewhere.

* **Hygrophila spinosa** T. And.; B. P. ii. 802. *Asteracantha longifolia* H. S. 485.
v. *Kantá kalika, kúliakhara.*
Wet or swampy places, everywhere.

413. **Ruellia** Linn.

* **Ruellia prostrata** Lamk. VAR. **dejecta** B. P. ii. 803. *Dipteracanthus dejectus* H. S. 483.
v. *Burigopana.*
Waste places; general.

Ruellia tuberosa Linn.; B. P. ii. 803.
In gardens and often as an escape; not yet introduced in 1845; native of America.

414. **Hemigraphis** Nees.

* **Hemigraphis hirta** T. And.; B. P. ii. 805. *Ruellia sarmentosa* H. S. 484.
Grassy glades, occasional.

415. **Phaylopsis** Willd.

* **Phaylopsis parviflora** Willd.; B. P. ii. 806. *Ætheilema reniforme* H. S. 486.
Grassy glades, general.

416. **Andrographis** Wall.

* **Andrographis paniculata** Nees.; H. S. 493; B. P. ii. 809.
v. *Mahatita, kálmegh.*
Roadsides and waste places, everywhere.

417. **Crossandra** Salisb.

* **Crossandra undulæfolia** Salisb.; B. P. ii. 811.
In gardens, generally; native of India.

418. **Barleria** Linn.

Barleria Prionitis Linn.; H. S. 486; B. P. ii. 812.
v. *Kánta játi.*
A common hedge plant; reported by Voigt from Serampore; it is wild in West Bengal, but can hardly be claimed as wild in our area.

* **Barleria cristata** Linn.; H. S. 485; B. P. ii. 812.
v. *Játi.*
Hedges and thickets, occasional.
VAR. * **dichotoma** B. P. ii. 812. *B. dichotoma* H. S. 485.
v. *Sada játi.*
Hedges and thickets, general.

419. Asystasia Bl.

* **Asystasia gangetica** T. And.; B. P. ii. 813. *A. coromandeliana* H. S. 484.
River banks and hedges, occasional.

420. Ecbolium Kurz.

* **Ecbolium Linneanum** Kurz VAR. **dentata**; B. P. ii. 816. *Justicia dentata* H. S. 490.
v. *Udu játi.*
Hedges and thickets, general.

421. Justicia Linn.

Justicia Betonica Linn.; B. P. ii. 817. *Adhatoda Betonica* H. S. 488.
In gardens, general; native of India.

* **Justicia Gendarussa** Linn. f.; B. P. ii. 818. *Gendarussa vulgaris* H. S. 489.
v. *Jagat madun, gandho-rusa.*

Hedges and thickets, everywhere, as an escape from cultivation; often also cultivated, but it may perhaps be accepted as wild in our area.

* **Justicia quinqueangularis** Koen.; B. P. ii. 818. *Rostellularia quinqueangularis* H. S. 488.

Goghat sub-division, Hughli district; also reported by Voigt from Serampore.

VAR. * **peploides** B. P. ii. 818. *Rostellularia glaberrima* H. S. 488.

Damp waste places, general.

* **Justicia simplex** D. Don; B. P. ii. 818. *Rostellularia mollissima* H. S. 488.
Grassy glades, everywhere.

422. Adhatoda Nees.

* **Adhatoda Vasica** Nees; H. S. 488; B. P. ii. 819.
v. *Bakás, Vásaka.*
Hedges and village-shrubberies, everywhere.

423. Rhinacanthus Nees.

Rhinacanthus communis Nees; H. S. 490; B. P. ii. 819.
v. *Palak jui, jui pana.*
In gardens generally; native of India.

424. **Peristrophe** Nees.

* **Peristrophe bicalyculata** Nees; H. S. 492; B. P. ii. 820.
v. *Nasa bhaga.*
Dry waste places and fields, west of the river Hughli only.

* **Peristrophe tinctoria** Nees; H. S. 492; B. P. ii. 820.
v. *Bet rang, chatia rang.*
Village-shrubberies near Calcutta; occasionally also in native gardens, cultivated; no doubt originally an introduced plant, but where truly wild is not now known.

425. **Rungia** Nees.

* **Rungia parviflora** Nees. VAR. **pectinata**; H. S. 491; B. P. ii. 821.
Drier sloping banks, earth weeds and waste places, general.

426. **Dicliptera** Juss.

* **Dicliptera Roxburghiana** Nees; H. S. 492; B. P. ii. 822.
Waste places about Calcutta, occasional; probably not truly wild in our area; it is plentiful in Northern and Eastern Bengal.

LXXX.—VERBENACEÆ.

427. **Lantana** Linn.

* **Lantana indica** Roxb.; H. S. 472; B. P. ii. 824. *L. gogchana* H. S. 472.
Banks of river and nálás everywhere.

Lantana Camara Linn.; B. P. ii. 825. *L. aculeata* H. S. 472.
Village-shrubberies and hedges, general; native of Central America.

428. **Lippia** Linn.

* **Lippia nodiflora** Rich.; B. P. ii. 825. *Zapania nodiflora* H. S. 472.
v. *Bhui-okra, chhota okra.*
Wet places, everywhere.

Lippia geminata H. B. & K.; B. P. ii. 825.
Banks of river and nálás, general; native of America.

429. **Stachytarpheta** Vahl.

Stachytarpheta indica Vahl; B. P. ii. 826. *S. jamaicensis* H. S. 471.
In native gardens; also sometimes as an escape; seems wild in many parts of India, but probably was originally introduced from America.

430. Verbena Linn.

* **Verbena officinalis** Linn.; H. S. 471; B. P. ii. 826.

A weed in gardens and waste places, frequent.

Though not claimed by Voigt as being wild in our area, it has quite as much right to be so considered as many of the other common weeds.

431. Duranta Jacq.

Duranta Plumieri Jacq.; H. S. 471; B. P. ii. 827.

Planted in hedges and on lawns; also sometimes sub-spontaneous in abandoned gardens and, rarely, in village-shrubberies.

432. Callicarpa Linn.

Callicarpa cana Linn.; H. S. 467; B. P. ii. 828.

v. *Arusha.*

Often planted in native gardens; sometimes as if wild in village-shrubberies; native of Malaya.

* **Callicarpa macrophylla** Vahl.; B. P. ii. 828. *C. incana* H. S. 467.

v. *Mathara.*

Village-shrubberies and roadsides, general.

* **Callicarpa longifolia** Lamk. VAR. **lanceolaria**; B. P. ii. 828. *C. lanceolaria* H. S. 467.

Village-shrubberies and roadsides, rare.

433. Tectona Linn. f.

Tectona grandis Linn. f.; H. S. 470; B. P. ii. 828.

v. *Sagun.*

Planted occasionally in avenues; native of drier parts of India and Indo-China.

434. Gmelina Linn.

* **Gmelina arborea** Roxb.: H. S. 470; B. P. ii. 829.

v. *Gámbár.*

Goghat sub-division of Hughli district; elsewhere often planted or semi-wild in village-shrubberies.

Gmelina asiatica Linn.; H. S. 470; B. P. ii. 829.

v. *Badhára.*

In gardens generally; native of India.

435. **Premna** Linn.

* **Premna integrifolia** Linn.; B. P. ii. 830. *P. barbata* H. S. 468 *P. spinosa* H. S. 468. *P. hircina* H. S. 468.
v. *Bhút biravi, goniari.*
Banks of rivers and village-shrubberies, especially plentiful in the Sundribuns.

Premna esculenta Roxb.; H. S. 467; B. P. ii. 831.
Cultivated near villages.

436. **Vitex** Linn.

* **Vitex trifolia** Linn.; H. S. 468; B. P. ii. 833.
v. *Pani sanbhaki.*
Hedges and thickets, general.

* **Vitex Negundo** Linn.; H. S. 469; B. P. ii. 833.
v. *Sanbhalu, nishinda.*
Hedges and thickets, general; Western Sundribuns, common.

437. **Clerodendron** Linn.

* **Clerodendron inerme** Gærtn.; H. S. 465; B. P. ii. 835.
v. *Ban jai, ban jumat, bat raj.*
Western Sundribuns; salt-lakes near Calcutta.

* **Clerodendron infortunatum** Gærtn.; B. P. ii. 835. *C. viscosum* H. S. 465.
v. *Bhánt.*
Roadsides, waste places, village-shrubberies; everywhere.

Clerodendron fragrans Vent.; H. S. 466; B. P. ii. 835.
In gardens everywhere, but often as an escape; native of China.

* **Clerodendron Siphonanthus** R. Br.; H. S. 465; B. P. ii. 836.
v. *Bamun-hatti.*
Waste places, everywhere.

438. **Avicennia** Linn.

Avicennia officinalis Linn.; B. P. ii. 838. *A. tomentosa* H. S. 473.
v. *Báen, Bina.*
Western Sundribuns, very common.

LXXXI.—LABIATÆ.

439. **Ocimum** Linn.

Ocimum sanctum Linn.; H. S. 448; B. P. ii. 843.
v. *Tulsi, kala tulsi, krishna tulsi.*

Near temples and shrines everywhere, planted or as an escape; native of India.

Ocimum gratissimum Linn.; H. S. 448; B. P. ii. 843.
v. *Ram tulsi.*
In gardens and sometimes as an escape; native of S. E. Asia.

Ocimum Basilicum Linn.; H. S. 447; B. P. ii. 843.
v. *Babui tulsi, gulál tulsi.*
In gardens and also in waste places as if wild; native of S. E. Asia.

Ocimum viride Willd.
v. *Belati Tulsi.*
In gardens, recently introduced owing to its reputed property of keeping off mosquitoes; native of Africa.

Ocimum adscendens Willd.; H. S. 448.
v. *Ban tulsi.*
Reported by Voigt from Serampore, not at all a likely record as the species seems naturally confined to the Deccan and C. India; examples may of course have been met with at Serampore; but, if so, they are almost certain to have been casuals introduced with seed of other plants from the drier parts of India.

440. Moschosma Reichb.

* **Moschosma polystachyum** Reichb.; H. S. 449; B. P. ii. 845.
Goghat sub-division, Hughli district.

441. Coleus Lour.

Coleus aromaticus Benth.; B. P. ii. 847. *C. amboinicus* H. S. 450.
v. *Pathorchur.*
In gardens everywhere.

Coleus scutellarioides Benth.; H. S. 450; B. P. ii. 847.
In gardens generally.

442. Hyptis Jacq.

Hyptis capitata Jacq.; B. P. ii. 848.
In gardens, and sometimes self-sown.

443. Pogostemon Desf.

* **Pogostemon plectranthoides** Desf.; H. S. 451; B. P. ii. 849.
v. *Jui lata, bil lata.*
Hedges and thickets, general.

444. **Dysophylla** Bl.

* **Dysophylla verticillata** Benth.; H. S. 452; B. P. ii. 851.
v. *Pani kala.*
Rice-fields and ditches, general.

445. **Anisomeles** R. Br.

* **Anisomeles ovata** R. Br.; H. S. 460; B. P. ii. 853.
v. *Gobura.*
Hedges, thickets and waste places, everywhere.

446. **Leonurus** Linn.

Leonurus sibiricus Linn.; H. S. 460; B. P. ii. 854.
v. *Gúma.*

A weed of roadsides and waste places, and one of the commonest plants in such localities, but obviously only naturalised; native of temperate Asia.

447. **Leucas** R. Br.

* **Leucas aspera** Spreng.; H. S. 461; B. P. ii. 855.
v. *Chhota halkúsa.*
A weed of fields and waste places, general.

* **Leucas linifolia** Spreng; H. S. 462; B. P. ii. 856.
v. *Halkúsa.*
A weed of fields and waste places, everywhere.

* **Leucas Cephalotes** Spreng.; H. S. 461; B. P. ii. 856.
v. *Bara halkúsa.*
A weed of field and waste places, fairly general.

* **Leucas mollissima** Wall.; H. S. 461; B. P. ii. 856.
Goghat sub-division, Hughli district.

* **Leucas procumbens** Desf.; H. S. 461; B. P. ii. 857.
v. *Basantá.*
A weed of gardens, fields and grassy glades, general.

448. **Leonotis** R. Br.

Leonotis nepetifolia R. Br.; H. S. 462; B. P. ii. 857.
v. *Khajur churi, hejurchi.*

Roadsides and waste places, general; associated with but always less common than *Leonurus sibiricus*, and like the *Leonurus* doubtless only a naturalised species anywhere in India; native of Africa.

449. Meriandra Benth.

Meriandra bengalensis Benth.; H. S. 453; B. P. ii. 858.
v. *Kafur-ka-pat.*
In native gardens, generally; native of Africa.

450. Salvia Linn.

* **Salvia plebeja** R. Br.; H. S. 455; B. P. ii. 859.
v. *Koka buradi*, *bhu-tulsi.*
In fields and gardens, a general weed.

Salvia coccinea Linn.; H. S. 455; B. P. ii. 859.
In gardens, generally; sometimes also self-sown.

INCOMPLETÆ.

LXXXII.—NYCTAGINEÆ.

451. Mirabilis Linn.

Mirabilis Jalapa Linn.; H. S. 328; B. P. ii. 862.
v. *Krishno káli.*
In gardens everywhere, and often as an escape; native of S. America.

452. Boerhaavia Linn.

* **Boerhaavia repens** Linn. VAR. **procumbens** B. P. ii. 863. *B. erecta* H. S. 328.
v. *Purna.*
Waste places, fields and roadsides, everywhere.

453. Bougainvillea Comm.

Bougainvillea glabra Choisy; B. P. ii. 863.
In gardens generally; native of Brazil.

Bougainvillea spectabilis Willd.; H. S. 329; B. P. ii. 864.
In gardens, often; native of Brazil.

454. Pisonia Linn.

Pisonia aculeata Linn.; B. P. ii. 864. *P. villosa* H. S. 328.
v. *Baghachura.*
Recorded by Voigt from Serampore; it is occasionally used as a hedge in our area but is not with us a wild plant; native of India and Indo-China.

LXXXIII.—AMARANTACEÆ.

455. Deeringia R. Br.

* **Deeringia celosioides** R. Br.; B. P. ii. 866. *D. indica* H. S. 315.
v. *Gola mohani.*
Hedges and thickets, occasional.

456. Celosia Linn.

Celosia argentea Linn.; H. S. 318; B. P. ii. 867.
v. *Swet murgha phul.*
In gardens, also self-sown, everywhere; native of S. E. Asia.

Celosia cristata Linn.; H. S. 318; B. P. ii. 869.
v. *Lalmurgha phul.*
In gardens, generally, occasionally also as an escape; native of S. E. Asia.

457. Digera Forsk.

* **Digera arvensis** Forsk.; B. P. ii. 868. *D. muricata* H. S. 314.
v. *Luta mahauria, gungatiya.*
Fields and roadsides, everywhere.

458. Amarantus Linn.

* **Amarantus spinosus** Linn.; H. S. 317; B. P. ii. 869.
v. *Kanta nuti, kanta miris.*
Fields and roadsides, everywhere.

* **Amarantus gangeticus** Linn.; H. S. 316; B. P. ii. 870.
v. *Lal shak, rakna shak.*
Cultivated in many races and varieties, the chief of these, apart from the type, being the *bans pati nati* (*A. lanceolatus*); the *lal bans pati nati* (*A. atropurpureus*); and the *gobura nati* (*A. lividus*).

* **Amarantus tristis** Linn.; H. S. 315. *A. gangeticus* VAR. *tristis*; B. P. ii. 870. *A. polygamus* H. S. 870.
v. *Champa nati.*
Cultivated in many races and varieties.

* **Amarantus mangostanus** Linn.; B. P. ii. 871.
v. *Shak.*
A weed of fields and gardens, everywhere.

* **Amarantus viridis** Linn.; H. S. 316; B. P. ii. 871.
v. *Ban nati.*
A weed of fields and gardens, general.

* **Amarantus fasciatus** Roxb.; H. S. 316. *A. viridis* VAR. *fasciata* B. P. ii. 871.
v. *Tun-tuni nati.*
A weed of fields and gardens, general.

* **Amarantus Blitum** Linn. VAR. **oleracea**; B. P. ii. 871. *A. oleraceus* VAR. *alba* H. S. 316.
v. *Sadz nati.*
Cultivated generally.

* **Amarantus polygamus** Linn.; B. P. ii. 871. *A. polygonoides* H. S. 315.
v. *Chiru nati.*
A weed of fields and gardens, general.

* **Amarantus tenuifolius** Willd.; H. S. 315; B. P. ii. 871.
v. *Ghenti nati, jelchumli.*
A weed of roadsides, waste places and fields, everywhere.

459. Pupalia Juss.

Pupalia atropurpurea Moq.; B. P. ii. 872. *Desmochæta atropurpurea* H. S. 319.
v. *Duya kuya, kuya duya.*
Recorded by Voigt from Serampore, a quite probable record, as the species is plentiful in districts to the west of our area.

460. Psilotrichum Moq.

* **Psilotrichum ferrugineum** Moq.; H. S. 318; B. P. ii. 873.
v. *Rakto sirinchi, lal sirinchi.*
A weed of fields and wet places, mostly to the east of the Hughli.

461. Ærua Forsk.

* **Ærua lanata** Juss.; H. S. 317; B. P. ii. 874.
v. *Chaya.*
Waste places and thickets, not uncommon.

Ærua scandens Mart.; H. S. 317; B. P. ii. 874.
v. *Nuriya.*
Reported by Voigt from Serampore; the record is possible but needs confirmation; the species in common in districts to the west of our area.

462. Achyranthes Linn.

* **Achyranthes aspera** Linn.; H. S. 318; B. P. ii. 875.
v. *Apáng.*
Waste places and roadsides, everywhere.

463. Alternanthera Forsk.

* **Alternanthera sessilis** R. Br.; H. S. 318; B. P. ii. 875.
v. *Chanchi.*
Waste places, roadsides and fields, everywhere.

464. Gomphrena Linn.

Gomphrena globosa Linn.; H. S. 318; B. P. ii. 876.
v. *Gul makhmal.*
In gardens, and in waste places as an escape, general; probably originally introduced from America.

LXXXIV.—CHENOPODIACEÆ.

465. Suæda Linn.

* **Suæda maritima** Dumort.; B. P. ii. 878. *Salsola indica* H. S. 322.
Western Sundribuns.

466. Chenopodium Linn.

* **Chenopodium album** Linn. H. S. 321; B. P. ii. 879. *C. laciniatum* H. S. 322.
v. *Chandan betu, betu shak.*
In gardens and also as a weed, everywhere.

Chenopodium ambrosioides Linn.; H. S. 321; B. P. ii. 879.
In waste places, naturalised, general; originally American.

467. Beta Linn.

Beta vulgaris Linn.; H. S. 320; B. P. ii. 879. *B. bengalensis* H. S. 321.
v. *Palang shak.*
In native gardens, general; native of Europe and temperate Asia.

468. Spinacia Linn.

Spinacia oleracea Linn.; H. S. 320; B. P. ii. 880. *S. tetrandra* H. S. 320.
v. *Palang, pinis.*
In gardens, general; native of Africa.

469. Arthrocnemum Moq.

* **Arthrocnemum indicum** Moq.; B. P. ii. 881. *Salicornia indica* H. S. 320.
v. *Jadu palang.*
Western Sundribuns.

470. Salicornia Linn.

* **Salicornia brachiata** Roxb.; H. S. 329; B. P. ii. 881.
Western Sundribuns.

471. Basella Linn.

* **Basella rubra** Linn.; B. P. ii. 882. *B. alba* H. S. 322. *B. cordifolia* H. S. 322.
v. *Poi, ban poi.*
In gardens, cultivated; also in hedges and thickets, everywhere.

LXXXV.—PHYTOLACCACEÆ.

472. Rivna Linn.

Rivina humilis Linn.; B. P. ii. 883. *R. lævis* H. S. 323.
In village-shrubberies, naturalised, not uncommon; native of America.

LXXXVI.—POLYGONACEÆ.

473. Polygonum Linn.

* **Polygonum plebejum** R. Br. VAR. **effusa**; B. P. ii. 886.
In damp places, everywhere.
VAR. * **brevifolia**; B. P. ii. 886.
In dry places, west of river Hughli.
VAR. * **elegans**; B. P. ii. 886. *P. herniarioides* H. S. 325.
In dry uncultivated or waste places, everywhere.

* **Polygonum orientale** Linn.; H. S. 324; B. P. ii. 886.
v. *Bara pani mirich.*
In damp places, general.

Polygonum tomentosum Willd.; H. S. 324; B. P. ii. 886.
Reported by Voigt from Serampore; not improbably, but the record needs confirmation.

Polygonum lanigerum R. Br.; H. S. 325. VAR. **effusa**; B. P. ii. 886.
v. *Swet pani mirich.*
Reported by Voigt from Serampore; quite possibly, but the record needs confirmation.

* **Polygonum glabrum** Willd.; H. S. 325; B. P. ii. 886.
In ditches and swamps, general.

Polygonum lapathifolium Linn.; B. P. ii. 325. *P. nutans* H. S. 324.
Once collected by Kurz near Shibpur, probably, however, only as an escape from the Botanic garden where it occurs as a casua'

immigrant. It is a common species in Eastern Bengal and Assam. *P. stagninum* is a species to be looked for in our areas as it is common both to the west and the north-east of our districts, though it has not been recorded by Voigt or by any subsequent collector.

* **Polygonum barbatum** Linn.; B. P. ii. 887, not of H. S. *P. rivulare* H. S. 325.
v. *Bikh anjubas.*
In damp places, general.

* **Polygonum serrulatum** Lagasc.; B. P. ii. 887. *P. flaccidum* H. S. 325.
v. *Pani mirich.*
In ditches and swampy places, general.

* **Polygonum Hydropiper** Linn.; B. P. ii. 887.
v. *Pakurmal.*
In ditches and beside ponds, not infrequent,

* **Polygonum flaccidum** Meisn.; B. P. ii. 887, not of H. S. *P. tenellum* H. S. 325.
In swamps and ditches, occasional.

474. Rumex Linn.

* **Rumex maritimus** Linn.; B. P. ii. 888. *R. Wallichianus* H. S. 326.
v. *Ban palang.*
In marshy spots, general.

* **Rumex dentatus** Linn.; B. P. ii. 889.
In waste places, general.

Rumex vesicarius Linn.; H. S. 326; B. P. ii. 889.
v. *Chuka palang.* Country Sorrel.
In native gardens, occasionally; native of Africa.

475. Antigonon Endl.

Antigonon leptopus Endl.; B. P. ii. 889.
Sandwich Island creeper.
In gardens, general; growing on trellises and fences.

LXXXVII.—ARISTOLOCHIACEÆ.

476. Aristolochia Linn.

* **Aristolochia indica** Linn.; H. S. 313; B. P. ii. 891.
v. *Isharmal.*
Hedges, roadsides and waste places, general.

LXXXVIII.—PIPERACEÆ.

477. Piper Linn.

Piper Chaba Hunter; H. S. 299; B. P. ii. 893.
v. *Choi.*
Cultivated generally; native of Malaya.

Piper Betle Linn.; H. S. 299; B. P. ii. 893.
v. Pán, tambuli. Betle-leaf.
Cultivated generally; native of S. E. Asia.

* **Piper longum** Linn.; H. S. 299; B. P. ii. 893.
v. *Pipla, pipla-mal.* Long Pepper.
In hedges and thickets, general, but possibly not truly wild in our area; native of India.

Piper nigrum Linn.; H. S. 299; B. P. ii. 893.
v. *Gulmirich, kala mirich.* Black Pepper.
Cultivated generally.

478. Peperomia Ruiz & Pav.

Peperomia pellucida Kunth; B. P. ii. 894.
Paths, roadsides, waste places, open glades, everywhere; introduced since 1845; native of America. Now one of the most plentiful of our annual weeds.

LXXXIX.—LAURINEÆ.

479. Cinnamomum Bl.

Cinnamomum Tamala Fr. Nees; B. P. ii. 899. *C. albiflorum* H. S. 308.
v. *Tezpat.*
Often planted in native gardens; native of E. Himalaya and Indo-China.

Cinnamomum Camphora Fr. Nees; B. P. ii. 899. *Camphora officinarum* H. S. 308.
v. *Kaphur.*
Occasionally planted in native gardens; native of China.

480. Litsæa Lamk.

* **Litsæa sebifera** Pers.; B. P. ii. 902. *Tetranthera Roxburghii* VAR. **apetala** H. S. 309.
v. *Kukur chita.*

Thickets and village-shrubberies, everywhere.

VAR. * **glabraria** Hook. f.; B. P. ii. 902. *Tetranthera laurifolia* H. S. 310.

Hedges, thickets and village-shrubberies; less common than the preceding and chiefly west of the river Hughli.

* **Litsæa polyantha** Juss.; B. P. ii. 903. *Tetranthera monopetala* H. S. 310.
v. *Bara kukur chita.*
Thickets and village-shrubberies, general.

* **Litsæa salicifolia** Hook. f. VAR. **laurifolia** Hook. f.; B. P. ii. 903.
v. *Súm.*
Thickets, east of the river Hughli, occasional.

481. Cassytha Linn.

Cassytha filiformis Linn.; H. S. 312; B. P. ii. 904.
v. *Akás-bél.*
Parasitic in hedges and thickets, general but not plentiful.

XC.—LORANTHACEÆ.

482. Loranthus Linn.

* **Loranthus Scurrula** Linn. VAR. **bengalensis**; B. P. ii. 911.
v. *Manda.*
Parasitic on trees, general.

* **Loranthus longiflorus** Desr.; H. S. 54; B. P. ii. 911.
v. *Bara manda.*
Parasitic on trees, everywhere.

* **Loranthus globosus** Roxb.; H. S. 54; B. P. ii. 912.
v. *Chhota manda.*
Parasitic on trees, everywhere.

483. Viscum Linn.

* **Viscum monoicum** Roxb.; B. P. ii. 912.
v. *Manda, banda.*
Parasitic on trees in the Western Sundribuns, less often near Calcutta.

XCI.—EUPHORBIACEÆ.

484. Euphorbia Linn.

Euphorbia antiquorum Linn.; H. S. 162; B. P. ii. 923.
v. *Bajvaran, tikata sij.*
In hedges generally; native of drier parts of India.

Euphorbia neriifolia Linn.; B. P. ii. 923. *E. ligularia* H. S. 161.
v. *Mansa sij.*
In hedges occasionally; native of drier parts of India.

Euphorbia Nivulia Ham.; H. S. 162; B. P. ii. 923.
v. *Sij.*
Hedges and village-shrubberies everywhere; native of drier parts of India.

Euphorbia Tirucalli Linn.; H. S. 162; B. P. ii. 924.
v. *Lanka sij.*
Hedges generally; native of Africa.

Euphorbia pulcherrima Willd; B. P. ii. 924. *Poinsettia pulcherrima* H. S. 164.
Gardens and lawns, general; native of America.

Euphorbia geniculata Ortega; B. P. ii. 924. *E. prunifolia* H. S. 163.
In gardens occasionally, sometimes also self-sown on rubbish heaps and in waste places; native of S. America.

Euphorbia heterophylla Linn.; B. P. ii. 924.
In gardens generally, also naturalized in waste places about Calcutta; native of America.

* **Euphorbia dracunculoides** Lamk; H. S. 164; B. P. ii. 924.
v. *Jychi, chhagal puputi.*
A field weed, west of the river Hughli only.

Euphorbia graminea Jacq.; B. P. ii. 924.
A weed of waste places about Calcutta; recently introduced; native of America.

* **Euphorbia hypericifolia** Linn. VAR. **indica**; B. P. ii. 924. *E. uniflora* H. S. 163.
Fields and waste places, general.
VAR. **parviflora**; B. P. ii. 924. *E. parviflora* H. S. 163.
Fields and waste places, west of the Hughli.

* **Euphorbia pilulifera** Linn.; B. P. ii. 925. *E. hirta* H. S. 163.
v. *Bara kerui.*
A weed of fields, gardens, waste places and roadsides, everywhere.

* **Euphorbia thymifolia** Linn.; H. S. 163; B. P. ii. 925.
v. *Swet kerui.*
A weed of fields, gardens and paths, everywhere.

* **Euphorbia microphylla** Heyne; B. P. ii. 925. *E. Chamæsyce* H. S. 163.
v. *Chhota kerui.*
A weed of waste places, west of the Hughli, rare.

485. Pedilanthus Neck.

Pedilanthus tithymaloides Poit.; H. S. 164; B. P. ii. 925.
v. *Belati sij.*
A hedge plant everywhere, sometimes also naturalized in village-shrubberies; native of America.

486. Bischofia Bl.

Bischofia javanica Bl.; B. P. ii. 926. *Stylodiscus trifoliatus* H. S. 160.
Planted in avenues and occasionally on roadsides; native of India, Indo-China and Malaya.

487. Bridelia Willd.

* **Bridelia stipularis** Bl.; B. P. ii. 928. *B. scandens* H. S. 156.
v. *Harin kara.*
Village-shrubberies, also Western Sundribuns.

* **Bridelia tomentosa** Bl.; B. P. ii. 928. *B. lanceæfolia* H. S. 156.
v. *Mindri, sirai.*
Village-shrubberies, occasional.

488. Glochidion Forst.

Glochidion multiloculare Voigt; H. S. 152; B. P. ii. 930. *Agyneia puber* H. S. 155.
Reported by Voigt from Serampore, a quite possible record, but one that needs confirmation; the shrub may be looked for in village-shrubberies; it is common in most other parts of Bengal.

489. Flueggea Willd.

* **Flueggea microcarpa** Bl.; B. P. ii. 931. *F. retusa* H. S. 152. *F. virosa* H. S. 152.
Village-shrubberies, hedges, waysides and river banks, general.

490. Agyneia Vent.

* **Agyneia bacciformis** A. Juss.; B. P. ii. 932. *Phyllanthus bacciformis* H. S. 154.
Damp fields in 24-Pergunnahs, south-east of Calcutta, also in the North-Western Sundribuns.

491. **Breynia** Forst.

* **Breynia rhamnoides** Muell.-Arg.; B. P. ii. 933. *Phyllanthus reticulatus* H. S. 154.
v. *Kali sitki, hamkatoguli.*
Hedges and thickets, general.

492. **Phyllanthus** Linn.

* **Phyllanthus reticulatus** Poir.; B. P. ii. 935. *P. multiflorus* H. S. 154.
v. *Panjuli.*
Hedges and thickets, everywhere.

Phyllanthus Emblica Linn.; B. P. ii. 935. *Emblica officinalis* H. S. 153.
v. *Ámla.*
In gardens, occasionally; native of drier parts of India.

Phyllanthus maderaspatensis Linn.; H. S. 153; B. P. ii. 935. *P. obcordatus* H. S. 154.

Both the decumbent form (*P. maderaspatensis* proper) and the tall slender form (*P. obcordatus*) of this species are reported from Serampore by Voigt, but both records are somewhat unlikely and both need confirmation; the species is common in the drier parts of India, but there are no specimens of any of its varieties from our area in the Calcutta herbarium.

***Phyllanthus urinaria** Linn.; H. S. 154; B. P. ii. 935.
v. *Hazar mani.*
In waste shady places, general.

* **Phyllanthus simplex** Retz; H. S. 153; B. P. ii. 936.
A weed in cultivated ground, mostly west of the river Hughli.

* **Phyllanthus Niruri** Linn.; H. S. 154; B. P. ii. 936.
v. *Bhui amla, sada hazar mani.*
A weed of cultivated ground, everywhere.

Phyllanthus distichus Muell.-Arg.; B. P. ii. 936. *Cicca disticha* H. S. 153.
v. *Noari, nubari, loda, hariphul.*
In native gardens, general; native place uncertain.

493. **Putranjiva** Wall.

Putranjiva Roxburghii Wall.; H. S. 296; B. P. ii. 936.
v. *Jia pata, putranjiva.*

In avenues and on roadsides, also often spontaneously in village-shrubberies; native of India.

494. Antidesma Linn.

* **Antidesma Ghæsembhilla** Gærtn.; B. P. ii. 938.
v. *Khudi jamb, tim tóa.*
In village-shrubberies, general.

* **Antidesma diandrum** Roth.; B. P. ii. 938.
v. *Multa.*
In village-shrubberies, occasional.

495. Jatropha Linn.

Jatropha multifida Linn.; H. S. 159; B. P. ii. 941.

In native and other gardens, and near temples and shrines, cultivated; also occasionally self-sown in waste places; native of America.

Jatropha gossypifolia Linn.; B. P. ii. 941.
v. *Lal bherenda.*

Waste places, roadsides, village-shrubberies everywhere, never cultivated; native of America. Though now one of the commonest and most striking of the shrubby weeds of our area, this species is not included in Voigt's list, published so recently as 1845.

Jatropha Curcas Linn.; H. S. 158; B. P. ii. 941.
v. *Bagh bherenda.*

In native gardens and hedges everywhere, and sometimes sub-spontaneous in village-shrubberies.

496. Aleurites Forst.

Aleurites moluccana Willd.; B. P. ii. 942. *A. triloba* H. S. 159.
v. *Akrot.*

Planted generally; Voigt even records it from Serampore as wild, and it does sometimes occur sub-spontaneously, but it has no claim to be indigenous; native of Papuasia.

497. Croton Linn.

* **Croton oblongifolius** Roxb.; H. S. 156; B. P. ii. 943.
v. *Chucka, bara gachh.*
Village-shrubberies, everywhere.

* **Croton caudatus** Geisel.; B. P. ii. 943. *C. drupaceus* H. S. 156.
v. *Nan bhantúr.*

Village-shrubberies and thickets on river banks, chiefly east of the river Hughli; also in the North-Western Sundribuns.

* **Croton Tiglium** Linn.; H. S. 156; B. P. ii. 943.
v. *Jayapala, jeypal.*

In hedges near villages everywhere, also often self-sown in village thickets; native of S. E. Asia.

Croton sparsiflorus Morong.

Abundant in waste places to the south of Calcutta, particularly about Diamond Harbour, a recently introduced weed; native of Paraguay.

498. Codiæum Juss.

Codiæum variegatum Bl.; B. P. ii. 944. *C. chrysosticta* H. S. 157.

In gardens everywhere: the "Croton" of English denizens; native of the Moluccas.

499. Chrozophora Neck.

* **Chrozophora plicata** A. Juss.; H. S. 156; B. P. ii. 944.

v. *Khûdi okra.*

Waste ground and dry fields, everywhere.

500. Gelonium Roxb.

* **Gelonium multiflorum** A. Juss.; B. P. ii. 945. *G. fasciculatum* H. S. 158.

v. *Ban naranga.*

In village-shrubberies, general.

Voigt also reports *G. lanceolatum*, a native of S. India and Ceylon, from Serampore, but if the species did exist there in 1845, it can only have been as a planted tree.

501. Baliospermum Bl.

* **Baliospermum axillare** Bl.; B. P. ii. 946. *Croton polyandrum* H. S. 156.

v. *Dánti, hakun.*

Waste places and fields in Goghat sub-division; also reported by Voigt from Serampore.

502. Acalypha Linn.

* **Acalypha fallax** Muell.-Arg.; B. P. ii. 947.

Fields, gardens and waste places about Calcutta, very common.

* **Acalypha indica** Linn.; H. S. 160; B. P. ii. 948.

v. *Makta juri, kokli.*

Fields, gardens and waste places, general.

Acalypha ciliata Forsk.; H. S. 159; B. P. ii. 948.

Reported by Voigt from Serampore, but the record needs confirmation; the species is found in Behar and westward to Arabia and Africa.

503. **Trewia** Linn.

* **Trewia nudiflora** Linn.; H. S. 279; B. P. ii. 948.
v. *Pitáli.*
River banks, everywhere.

504. **Mallotus** Lour.

* **Mallotus repandus** Muell. Arg.; B. P. ii. 949. *Rottlera laccifera* H. S. 157.
v. *Akús, nun bhantúr.*
Village-shrubberies and hedges, general.

Mallotus philippinensis Muell. Arg.; B. P. ii. 950. *Rottlera tinctoria* H. S. 157.
v. *Kamala.*

Sometimes planted about villages; native of the drier parts of India. Voigt records this as not having flowered in the Royal Botanic Garden between 1797, when it was first introduced, and 1814; and adds that at Serampore it had not flowered up to 1845. In some years at least it flowers freely, and occasionally self-sown young plants are to be met with in the Royal Botanic Garden.

505. **Ricinus** Linn.

Ricinus communis Linn.; H. S. 158; B. P. ii. 952.
v. *Bherenda.*

Cultivated everywhere in gardens and fields, and very common spontaneously in village shrubberies; native of Africa.

506. **Tragia** Linn.

* **Tragia involucrata** Linn.; H. S. 160; B. P. ii. 952.
v. *Bichchati.*

Hedges, everywhere. Voigt also records the narrowly 3-partite leaved variety (VAR. **cannabina** = *T. cannabina* Linn.) from Serampore; this is a quite possible record, but it needs to be confirmed.

507. **Sapium** P. Br.

* **Sapium indicum** Willd.; H. S. 161; B. P. ii. 954.
v. *Hurna batul.*
Western Sundribuns.

Sapium sebiferum Roxb.; B. P. ii. 954. *Stillingia sebifera* H. S. 161.
v. *Móm china.*
In village-shrubberies, general; native of China.

508. **Excœcaria** Linn.

* **Excœcaria Agallocha** Linn.; H. S. 161; B. P. ii. 955.
v. *Géngwa, géo, ghéria.*
Western Sundribuns; salt lakes near Calcutta and banks of Hughli as far north as Uluberia.

XCII.—URTICACEÆ.

509. **Trema** Lour.

* **Trema orientalis** Bl.; B. P. ii. 960. *Sponia orientalis* H. S. 294.
v. *Jilun, chikun.*
Village-shrubberies, hedges and waste places, everywhere.

510. **Cannabis** Linn.

Cannabis sativa Linn.; H. S. 282; B. P. ii. 960.
v. *Ganja.* The Hemp Plant.
A prohibited plant in our area, but occasionally occurring as a roadside weed; native of Siberia.

511. **Fleurya** Gaud.

* **Fleurya interrupta** Gaud.; B. P. ii. 961. *Bœhmeria interrupta* H. S. 281.
v. *Lal bichchiti.*
Waste places and roadsides, general.

512. **Pilea** Lindl.

* **Pilea microphylla** Liebn.; B. P. ii. 962.
Damp paths, old walls, rubbishy places; everywhere.

513. **Bœhmeria** Jacq.

Bœhmeria nivea Hook. & Arn.; B. P. ii. 964. *Urtica nivea* H. S. 280.
v. *Kankhúra.*
Occasionally cultivated, but not by natives, near Calcutta.

514. **Pouzolzia** Gaud.

* **Pouzolzia indica** Gaud.; B. P. ii. 965.
Waste places, roadsides and fields, west of the river Hughli only, and always rare.

VAR. * **alienata** Wedd.; B. P. ii. 965. *Urtica tuberosa* H. S. 280 (*not* U. tuberosa *Roxb.*).
v. *Chandar muli.*
Waste places, roadsides and fields, everywhere.

515. **Broussonetia** Vent.

Broussonetia papyrifera Vent.; H. S. 284; B. P. ii. 967.

Occasionally planted and wherever this is the case readily springing up spontaneously: native of Eastern Asia.

516. **Morus** Linn.

Morus indica Linn.; H. S. 283; B. P. ii. 968.

v. *Tút, tutri.*

Cultivated, but very rarely so in our area; native of the Himalaya.

517. **Streblus** Lour.

* **Streblus asper** Lour.; B. P. ii. 969. *Trophis aspera* H. S. 291.

v. *Shióra.*

Hedges and village-shrubberies, everywhere.

518. **Artocarpus** Forst.

Artocarpus integrifolia Linn. f.; H. S. 289; B. P. ii. 971.

v. *Kathál.* The Jack Fruit.

Planted everywhere; sometimes as if wild in village-shrubberies; native of India.

Artocarpus Lakoocha Roxb.; H. S. 290; B. P. ii. 971.

v. *Déphul, lakúch.*

In gardens, frequent; occasionally as if wild in village-shrubberies; native of India.

In one or two compounds within the city of Calcutta, but not elsewhere, examples of the Bread Fruit tree (*Artocarpus incisa*) are to be met with. Though it can be made to live in the vicinity of buildings in the town, it does not survive when planted in suburban gardens.

519. **Ficus** Linn.

Ficus Benjamina Linn. VAR. **comosa** Kurz; B. P. ii. 979.

Planted in avenues; native of S. E. Asia.

* **Ficus bengalensis** Linn.; B. P. ii. 979. *F. indica* H. S. 286.

v. *Bar, but.*

Planted, but also wild or at least self-sown on tombs and trees; native of India.

* **Ficus retusa** Linn. VAR. **nitida** King; B. P. ii. 980. *F. Benjamina* H. S. 289.

v. *Jir, sir.*

In village-shrubberies and in Sundribuns forests.

* **Ficus religiosa** Linn.; H. S. 287; B. P. ii. 980.
v. *Asvattha, pipal.*
In village-shrubberies and on old buildings, everywhere.

* **Ficus Rumphii** Bl.; H. S. 287; B. P. ii. 980.
v. *Gaiasvattha.*
In village-shrubberies and on river banks; also Sundribuns.

* **Ficus infectoria** Roxb.; B. P. ii. 981. *F. venosa* H. S. 287.
v. *Pakúr.*
Village-shrubberies, general.

* **Ficus heterophylla** Linn.; B. P. ii. 981. *F. rubescens* H. S. 285.
v. *Gaori sheoṙa, ghoti seora.*
In damp places, occasional.
VAR. * **repens** King; B. P. ii. 981. *F. repens* H. S. 285.
v. *Bhui dumar.*
Edges of ponds and ditches, general.

* **Ficus hispida** Linn. f.; B. P. ii. 981. *F. oppositifolia* H. S. 288.
v. *Dumar, kák dumar.*
Hedges and thickets, everywhere.

Ficus pumila Linn.; B. P. ii. 982.
Grown generally on walls as a substitute for Ivy.

* **Ficus glomerata** Roxb.; H. S. 288; B. P. ii. 983.
v. *Jagya dumar, yajna dumar.*
In village-shrubberies, occasional.

XCIII.—CASUARINEÆ.

520. Casuarina Forst.

Casuarina equisetifolia Forst.; B. P. ii. 985. *C. muricata* H. S. 297.
v. *Belati jhau.*
Avenues and roadsides, but also very commonly self-sown; native of sea coasts from Polynesia to Chittagong.

XCIV.—CERATOPHYLLEÆ.

521. Ceratophyllum Linn.

* **Ceratophyllum demersum** Linn.; B. P. ii. 990. *C. verticillatum.* H. S. 293.
v. *Jhangi.*
In ponds and ditches, everywhere.

GYMNOSPERMEÆ.

XCV.—CONIFERÆ.

522. Thuya Linn.

Thuya orientalis Linn.; H. S. 557; B. P. ii. 992.
In gardens and on lawns about Calcutta; native of China.

523. Cupressus Tournef.

Cupressus sempervirens Linn.; H. S. 558.
v. *Saras.*
In gardens, occasionally; native of the Orient.

XCVI.—CYCADACEÆ.

524. Cycas Linn.

Cycas revoluta Thunb.; H. S. 555; B. P. ii. 993.
In gardens and on lawns about Calcutta; native of Japan.

MONOCOTYLEDONES.

XCVII.—HYDROCHARIDEÆ.

525. Hydrilla Rich.

* **Hydrilla verticillata** Casp.; H. S. 617; B. P. ii. 995.
v. *Jhangi kurali.*
In ponds, everywhere.

526. Lagarosiphon Harv.

* **Lagarosiphon Roxburghii** Benth.; B. P. ii. 995. *Vallisneria alternifolia* H. S. 618.
v. *Rasna jhangi.*
In ponds, general.

527. Vallisneria Linn.

* **Vallisneria spiralis** Linn.; H. S. 617; B. P. ii. 996.
v. *Syala.*
In ponds, everywhere.

528. Blyxa Thouars.

* **Blyxa Roxburghii** Rich.; B. P. ii. 996. *B. octandra* H. S. 618.
v. *Pata syala.*
In ponds, general.

529. **Hydrocharis** Linn.

* **Hydrocharis cellulosa** Ham.; B. P. ii. 997.
In ponds, north-east of Calcutta, rather rare.

530. **Ottelia** Pers.

* **Ottelia alismoides** Pers ; H. S. 618; B. P. ii. 997.
v. *Parmi kalla, pani kalla.*
In ponds, everywhere.

XCVIII.—ORCHIDACEÆ.

531. **Dendrobium** Sw.

* **Dendrobium anceps** Sw.; B. P. ii. 1009. *Aporum anceps* H. S. 623.
Western Sundribuns.

* **Dendrobium Pierardi** Roxb.; H. S. 623; B. P. ii. 1009.
Western Sundribuns.

532. **Pachystoma** Lindl.

* **Pachystoma senile** Reichb. f.; B. P. ii. 1014. *Geodorum ramentaceum* H. S. 628.
In grassy places, rare.

533. **Eulophia** R. Br.

* **Eulophia graminea** Lindl.; B. P. ii. 1016. *E. virens* H. S. 629 (the Bengal plant).
v. *Badbári.*
In dry grassy places, west of the Hughli, rare.

534. **Geodorum** Jacks.

* **Geodorum dilatatum** R. Br.; H. S. 628; B. P. ii. 1017.
In grassy glades, not uncommon.

Geodorum purpureum R. Br.; H. S. 628.
Recorded by Voigt from Serampore, quite a possible record, but requires confirmation; native of India.

535. **Luisia** Gaud.

* **Luisia brachystachys** Bl.; B. P. ii. 1019. *Cymbidium triste* H. S. 627 partly.
Western Sundribuns, common.

536. **Vanda** R. Br.

* **Vanda Roxburghii** R. Br.; H. S. 629; B. P. ii. 1021.
v. *Nái, rasna, banda.*
On trees, everywhere.

537. **Saccolabium** Bl.

* **Saccolabium papillosum** Lindl.; H. S. 630; B. P. ii. 1022.
On trees, rare to north of the Sundribuns, not infrequent in Sundribun forests.

538. **Cleisostoma** Bl.

Cleisostoma micranthum K. & P.; B. P. ii. 1023. *Saccolabium micranthum* H. S. 630.
Reported from Serampore by Voigt, a quite possible record, but it needs confirmation.

539. **Sarcanthus** Lindl.

* **Sarcanthus insectifer** Reichb. f.; B. P. ii. 1023.
Western Sundribuns, on trees, very common.

540. **Didymoplexis** Griff.

* **Didymoplexis pallens** Griff.; B. P. ii. 1025.
In shady thickets, general.

541. **Pogonia** Juss.

* **Pogonia plicata** Lindl.; H. S. 632; B. P. ii. 1026.
In shady thickets, general.

* **Pogonia juliana** Wall.; H. S. 632; B. P. ii. 1026.
In shady thickets, rare.

* **Pogonia carinata** Lindl.; H. S. 632; B. P. ii. 1026.
In shady thickets, general.

542. **Zeuxine** Lindl.

* **Zeuxine sulcata** Lindl.; H. S. 633; B. P. ii. 1029.
v. *Swet huli.*
In grassy open spaces, general.

543. **Habenaria** Willd.

* **Habenaria digitata** Lindl.; B. P. ii. 1032.
Grassy places, very rare.

Habenaria commelinifolia Wall.; H. S. 632; B. P. ii. 1033.

Reported from Serampore by Voigt, the record needs confirmation.

* **Habenaria marginata** Colebr.; H. S. 632; B. P. ii. 1033.
Grassy places, very rare.

* **Habenaria viridiflora** R. Br.; B. P. ii. 1033. *H. tenuis* H. S. 632.
Grassy places, very rare.

XCIX.—SCITAMINEÆ.

544. Globba Linn.

Globba sessiliflora Sims.

In gardens, drops its bulbils freely and thereby readily comes up spontaneously in garden borders and in shady grassy places; native of Burma.

545. Kaempferia Linn.

Kaempferia Galanga Linn.; H. S. 566; B. P. ii. 1038.
v. *Chandu múla, humula.*
In gardens, general: native of S. E. Asia.

Kaempferia rotunda Linn.; H. S. 566; B. P. ii. 1038.
v. *Bhui champa.*
In gardens, occasional; native of S. E. Asia.

546. Hedychium Koen.

Hedychium coronarium Koen; H. S. 568; B. P. ii. 1039.
v. *Gorakh natha, dulala champa.*

In gardens and also sometimes in village-shrubberies, but though reported by Voigt from Serampore (as wild) is probably always an escape in our area; native of S. E. Asia.

547. Curcuma Linn.

* **Curcuma aromatica** Salisb.; H. S. 563; B. P. ii. 1042.
v. *Jangli haldi, ban haldi.*

In village-shrubberies about Calcutta and elsewhere in our districts.

Curcuma Zedoaria Roscoe; H. S. 564; B. P. ii. 1042.
v. *Kachúra.*
Cultivated pretty generally.

Curcuma cæsia Roxb.; H. S. 563; B. P. ii. 1042.
v. *Kala haldi.*

Reported by Voigt from Serampore; a possible record, since the species is common immediately to the west of our area, but one that needs confirmation.

* **Curcuma ferruginea** Roxb.; H. S. 563; B. P. ii. 1042.
Village thickets near Shibpur.

* **Curcuma rubescens** Roxb.; H. S. 564; B. P. ii. 1042.
Village-shrubberies, general.

Curcuma longa Linn.: H. S. 565; B. P. ii. 1042.
v. *Haldi.*
Cultivated generally.

Curcuma Amada Roxb.; H. S. 564; B. P. ii. 1042.
v. *Âm ada.*
Cultivated generally.

548. Zingiber Adans.

Zingiber Zerumbet Sm.; H. S. 562; B. P. ii. 1045.
v. *Maha bar bach, nar kachûr.*
Cultivated and as if wild in village-shrubberies, native of S. E. Asia.

Zingiber Casumunar Roxb.; H. S. 562; B. P. ii. 1045.
v. *Ban-ada.*
Cultivated and as if wild in village-shrubberies and on abandoned sites in the Sundribuns; native of India.

Zingiber officinale Roscoe; H. S. 561; B. P. ii. 1045.
v. *Adrak, ada.*
Cultivated sparingly; native of S. E. Asia.

549. Costus Linn.

* **Costus speciosus** Sm.; H. S. 572; B. P. ii. 1045.
v. *Kust, keu.*
In village-shrubberies and shady waste places.

550. Alpinia Linn.

Alpinia Galanga Sw.; H. S. 570; B. P. ii. 1047.
v. *Kulanjan.*
In gardens, occasionally.

* **Alpinia Allughas** Roscœ; H. S. 570; B. P. ii. 1047.
v. *Taro, taruko.*
Muddy river banks, general.

551. Canna Linn.

Canna indica Linn.; H. S. 576. VAR. **orientalis** B. P. ii. 1047.
v. *Sbha jaya, sarba jaya.*

In gardens everywhere, but also very general in waste places as an escape: native of Eastern Asia.

552. **Maranta** Linn.

Maranta arundinacea Linn.; H. S. 575; B. P. ii. 1048.
v. *Tikhur.* Arrowroot.

Cultivated occasionally about Calcutta; native of the West Indies.

The name *Tikhur* is applied to and was probably originally restricted to various species of *Curcuma.*

553. **Musa** Linn.

Musa sapientum Linn.; B. P. ii. 1050. *M. paradisaica* H. S. 1050.
v. *Ram kela, kantali kela, kach kela.* Plantain.

Cultivated in numerous races, and also occurring in village-shrubberies as if wild: native of India. The vernacular name for all the forms is *kela.* The *ram kela* is the form with numerous black seeds that is occasionally found about villages; it does not, however, quite agree with the wild form of the species that occurs in the forests of Chota Nagpur and Chittagong, but is rather a form, feral by reversion, of the *kantali kela* or Cooking Plantain which is to be found in several races most of which may have been locally evolved. The numerous races, of *kach kela* or Dessert Plantain, on the other hand, would appear to be in no case of local origin, but to have been introduced from Southern India, Malaya, and possibly elsewhere.

C.—BROMELIACEÆ.

554. **Ananassa** Adans.

Ananassa sativa Linn.; B. P. ii. 1052. *Ananas sativus* H. S. 614.
v. *Ananas,* from the American name. Pine apple.

Sparingly cultivated about Calcutta; introduced to Asia from the West Indies.

CI.—HÆMODORACEÆ.

555. **Sanseviera** Thunb.

Sanseviera Roxburghiana Schult. f.; H. S. 556; B. P. ii. 1054.
v. *Murva, murba.* Bowstring Hemp.

Cultivated and sometimes as if wild in village-shrubberies; reported by Voigt from Serampore but certainly not wild in our area; it is indeed doubtful whether the species is really indigenous in India at all; if so, it is the only species of the genus that seems to be so; the other species are African.

Sanseviera trifasciata Hort.; B. P. ii. 1054.

Cultivated, but also sometimes in village-shrubberies; probably native of *West* Africa, but appears to have reached India from America where it is sometimes grown as *S. guineensis*, the West African Bowstring Hemp which is not naturalized and is hardly known even in cultivation, in India.

CII.—IRIDEÆ.

556. Cipura Aubl.

Cipura paludosa Aubl.; H. S. 601; B. P. ii. 1055.

Naturalized in thickets near Calcutta among grass; native of America.

557. Belamcanda Adans.

Belamcanda chinensis Leman; B. P. ii. 1056. *Pardanthus chinensis* H. S. 605.

v. *Dasbahu, dasbachandi.*

In gardens, everywhere; native of China.

CIII.—AMARYLLIDACEÆ.

558. Agave Linn.

Agave VeraCruz Mill. *A. cantula* B. P. ii. 1057.

v. *Kantala, bilati ananas.*

A hedge near villages; native of America.

Other species of *Agave* are occasionally grown as hedges.

559. Curculigo Gærtn.

* **Curculigo orchioides** Gærtn.; H. S. 580; B. P. ii. 1059.

v. *Tal muli, tal lura.*

Grassy places west of the river Hughli.

560. Zephyranthes Herb.

Zephyranthes tubispatha Herb.; H. S. 582; B. P. ii. 1060.

In gardens, but also sometimes appearing spontaneously in grassy places; native of Peru.

561. Crinum Linn.

* **Crinum asiaticum** Linn.; H. S. 588; B. P. ii. 1061.

v. *Bara kanur.*

Sundribuns, wild, plentiful; often also in gardens in our area.

* **Crinum defixum** Ker; H. S. 590; B. P. ii. 1061.
v. *Sukh darshan.*
Banks of ponds and ditches, common.

* **Crinum pratense** Herb.; H. S. 580; B. P. ii. 1061.
Wet places, rare.

Crinum latifolium Linn.; B. P. ii. 1061. *C. ornatum* VAR. *latifolium* H. S. 591.
In gardens, generally; wild in Orissa.

VAR. **zeylanica** B. P. ii. 1061. *C. ornatum* VAR. *zeylanicum* H. S. 591.
In gardens; wild in Orissa.

CIV.—DIOSCOREACEÆ.

582. Dioscorea Linn.

* **Dioscorea pentaphylla** Linn.; H. S. 653; B. P. ii. 1066.
v. *Kanta alu.*
Hedges and thickets, general.

* **Dioscorea bulbifera** Linn.; B. P. ii. 1066. *D. crispata* H. S. 652.
v. *Rat alu.*
Hedges and thickets, general.

Dioscorea fasciculata Roxb.; H. S. 652; B. P. ii. 1066.
v. *Susni alu.*
Cultivated only.

VAR. **spinosa** B. P. ii. 1066. *D. aculeata* H. S. 652.
v. *Mou alu.*
Thickets and village-shrubberies, general.

* **Dioscorea anguina** Roxb.; H. S. 652; B. P. ii. 1066.
v. *Kukur alu.*
Hedges and thickets, rare.

* **Dioscorea glabra** Roxb.; H. S. 653. *D. nummularia* B. P. ii. 1067.
v. *Shora alu.*
Hedges, thickets and village-shrubberies, general.

Dioscorea alata Linn.; H. S. 652; B. P. ii. 1067.
v. *Khám, kham alu.*
Generally cultivated.

VAR. **globosa** B. P. ii. 1067. *D. globosa* H. S. 652.
v. *Chupri alu.*
Generally cultivated.

VAR. **rubella** B. P. ii. 1067. *D. rubella* H. S. 652.
v. *Guraniya alu.*
Generally cultivated.

VAR. **purpurea** B. P. ii. 1067. *D. purpurea* H. S. 652.
v. *Rakto guraniya alu, lal guraniya.*
Generally cultivated.

CV.—LILIACEÆ.

563. Asparagus Linn.

* **Asparagus racemosus** Willd.; H. S. 674; B. P. ii. 1070.
v. *Sata muli.*
Hedges and thickets, occasional.

564. Smilax Linn.

* **Smilax prolifera** Roxb.; H. S. 648; B. P. ii. 1071.
v. *Kumarika.*
Hedges and thickets, general.

Smilax macrophylla Roxb.; B. P. ii. 1071. *S. ovalifolia* H. S. 648.
v. *Kumarika.*
Reported by Voigt from Serampore, a quite probable record but one that needs confirmation; the species is common in West Bengal.

565. Gloriosa Linn.

* **Gloriosa superba** Linn.; B. P. ii. 1073. *Methonica superba* H. S. 655.
v. *Ulat chandal.*
Hedges, generally.

566. Polianthes Linn.

Polianthes tuberosa Linn.; H. S. 656.
v. *Rajani gandha.* The Tuberose.
In native gardens, general; native of S. America.

567. Allium Linn.

Allium ascalonicum Linn.; H. S. 668; B. P. ii. 1075.
v. *Gandhan.* The Shalot.
In gardens everywhere, cultivated; native of the Orient.

Allium Cepa Linn.; H. S. 668; B. P. ii, 1075.
v. *Piyaj.* The Onion.
Cultivated generally; native of the Oriental and Mediterranean regions.

Allium tuberosum Roxb.; H. S. 669; B. P. ii. 1076.
v. *Ranga gandhina.* Indian Leek.

Recorded by Roxburgh as cultivated about Calcutta, but unknown to Voigt and not met with in our area as a crop by the writer: the species has, however, been raised from seeds received from Behar and the resulting plants compared and found to agree exactly with Roxburgh's drawing. It is just possible that it may be met with in gardens in the western part of Hughli district.

Allium ampeloprasum Linn.; H. S. 668; B. P. ii. 1076. *A. Porrum* H. S. 668.
v. *Paru, gandhina.* The Leek.

In gardens, generally; native of the Mediterranean and Oriental regions.

Allium sativum Linn.; H. S. 667; B. P. ii. 1076.
v. *Lasun, rashun.* Garlic.

Cultivated generally; native of the Mediterranean region.

568. Asphodelus Linn.

* **Asphodelus tenuifolius** Cav.; B. P. ii. 1076. *A. clavatus* H. S. 670.

In fields in the cold weather, but probably always a casual and introduced with seed sent from western provinces, where it is common.

569. Hemerocallis Linn.

Hemerocallis fulva Linn.; H. S. 670; B. P. ii. 1078.
v. *Gul nargis.*

In gardens, generally; native of China.

CVI.—PONTEDERIACEÆ.

570. Monochoria Presl.

* **Monochoria hastæfolia** Presl; B. P. ii. 1079. *Pontederia hastata* H. S. 645.
v. *Nukha.*

In ditches and rice-fields, general.

Monochoria vaginalis Presl; B. P. ii. 1079. *Pontederia vaginalis* H. S. 645.
v. *Nukha.*

Reported by Voigt from Serampore, and may quite possibly occur, because the species is plentiful in the Gangetic Plain to the north and also to the east of our districts; the record, however, needs confirmation.

VAR. * **plantaginea** Solms-Lanbach; B. P. ii. 1079. *Pontederia plantaginea* H. S. 645.

v. *Nukha.*

Ditches, ponds and rice-fields, everywhere.

CVII.—XYRIDEÆ.

571. Xyris.

* **Xyris pauciflora** Willd.; B. P. ii. 1080; *X. indica* H. S. 731, possibly.

v. *Dabi-duba.*

In wet places, about Serampore, Chandernagore and Jahanabad not seen from east of the Hughli in our area.

The species in our districts that alone is represented in the Calcutta Herbarium from our region is *X. pauciflora.* Voigt, however, gives *X. indica* as occurring at Serampore and notes *X. pauciflora* as a species that might be, but that up to 1845 had not yet been, introduced either to the Botanic Garden at Shibpur or to Dr. Carey's Garden at Serampore. From this it seems clear that only one species was present in our area in Voigt's time, and it is therefore possible that the specific names used by Voigt were misplaced. At the same time the occurrence of *X. indica* is not at all impossible since it occurs in Northern Bengal as well as in Orissa.

CVIII.—COMMELINACEÆ.

572. Commelina Linn.

* **Commelina nudiflora** Linn.; B. P. ii. 1082. *C. cæspitosa* H. S. 677.

Goghat, western parts of Hughli district; also reported by Voigt from Serampore.

* **Commelina salicifolia** Roxb.; H. S. 676; B. P. ii. 1082.

v. *Pani kanchira.*

Fields and damp waste places, general.

* **Commelina Hasskarlii** Clarke; B. P. ii. 1082.

v. *Kanchira.*

Shady places, general.

* **Commelina bengalensis** Linn.; H. S. 676; B. P. ii. 1082.

v. *Kanchira.*

Shady places, everywhere.

* **Commelina attenuata** Kœnig; B. P. ii. 1083.

Goghat, Western Hughli district.

* **Commelina obliqua** Ham.; B. P. ii. 1083. *C. communis* H. S. 677.
v. *Juta kanchira.*
Shady places, general.

* **Commelina appendiculata** Clarke; B. P. ii. 1083.
Shady places, east of river Hughli, rare.

* **Commelina suffruticosa** Bl.; B. P. ii. 1083.
Waste places, rare.

573. Aneilema R. Br.

* **Aneilema spiratum** R. Br.; B. P. ii. 1084. *A. nanum* H. S. 677.
In fields and waste places, everywhere.

* **Aneilema nudiflorum** R. Br.; H. S. 677; B. P. ii. 1084.
v. *Kanduli.*
Waste places, general.

* **Aneilema vaginatum** R. Br.; H. S. 677; B. P. ii. 1084.
Wet places, general.

574. Tradescantia Linn.

Tradescantia discolor L'Herit.; H. S. 678.
In gardens and also as an escape.

575. Cyanotis Don.

Cyanotis cristata Schult. f.; H. S. 678; B. P. ii. 1085.
Reported by Voigt from Serampore, the record requires verification. The species is common in Chota Nagpur.

* **Cyanotis axillaris** Rœm.; and Schult.; H. S. 678; B. P. ii. 1085.
v. *Baghanula.*
Fields and roadsides, general.

CIX.—FLAGELLARIEÆ.

576. Flagellaria Linn.

* **Flagellaria indica** Linn.; H. S. 681; B. P. ii. 1087.
v. *Ban chanda.*
Sundribuns, common; also reported by Voigt from Serampore, but probably not there truly wild.

CX.—JUNCACEÆ.

577. Juncus Linn.

* **Juncus prismatocarpus** R. Br.; B. P. ii. 1088.
Goghat, Western Hughli district, in wet places.

CXI.—PALMEÆ.

578. Corypha Linn.

Corypha umbraculifera Linn.; H. S. 640; B. P. ii. 1090 in part.

v. *Tali.*

In gardens and on lawns; introduced from Ceylon, doubtfully wild there and in Travancore.

Corypha Talliera Roxb.; H. S. 641. *C. umbraculifera* B. P. ii. 1090. in part.

v. *Tara.*

In gardens and on lawns; supposed to be wild in Bengal.

Corypha elata Roxb.; H. S. 641; B. P. ii. 1090.

v. *Bajur.*

In gardens and on lawns; supposed to be wild in Bengal.

579. Borassus Linn.

Borassus flabellifer Linn.; B. P. ii; 1092. *B. flabelliformis* H. S. 640.

v. *Tal gachh, tari.* The Palmyra tree.

In village-shrubberies, as if wild, everywhere; probably not, however, a native of India, certainly not indigenous in our area.

580. Nipa Wurmb.

* **Nipa fruticans** Wurmb.; H. S. 684; B. P. ii. 1094.

v. *Golpatta, gabua, gulga.*

Sundribuns.

581. Cocos Linn.

Cocos nucifera Linn.; H. S. 643; B. P. ii. 1095.

v. *Narikel.*

Planted generally; native of Polynesian coasts.

582. Phœnix Linn.

Phœnix sylvestris Roxb.; H. S. 642; B. P. ii. 1096.

v. *Khajur.*

Planted generally, sometimes sub-spontaneous; native of the Punjab.

* **Phœnix paludosa** Roxb.; H. S. 643; B. P. ii. 1096.

v. *Hital.*

Sundribuns.

583. **Areca** Linn.

Areca Catechu Linn.; H. S. 637; B. P. ii. 1097.
v. *Gua, supári.* Betel-nut Palm.
Cultivated generally; native of S. E. Asia.

584. **Calamus** Linn.

* **Calamus viminalis** Willd. VAR. **fasciculata** B. P. ii. 1099. *C. fasciculatus* H. S. 639.
v. *Bara bet.*
Village-shrubberies, general.

* **Calamus tenuis** Roxb.; H. S. 639; B. P. ii. 1099. *C. Rotang* H. S. 639, not of Linn.
v. *Sanchi bet.*
Sundribuns.

CXII.—PANDANACEÆ.

585. **Pandanus** Linn. f.

Pandanus fœtidus Roxb.; H. S. 683; B. P. ii. 1101.
v. *Keiya kanta, kotki kanta.*
In hedges, planted, generally; native of India.

* **Pandanus fascicularis** Lamk.; B. P. ii. 1101. *P. odoratissimus* H. S. 682.
v. *Keiya, keori.*
Sundribuns, common; elsewhere planted.

CXIII.—TYPHACEÆ.

586. **Typha** Linn.

* **Typha elephantina** Roxb.; H. S. 693; B. P. ii. 1102.
v. *Hogla.*
Margins of ponds and streams, very rare.

* **Typha angustata** Chamb. & Bory; B. P. ii. 1102. *T. angustifolia* H. S. 693.
v. *Ram hogla.*
Margins of ponds and streams, common.

CXIV.—AROIDEÆ.

587. **Pistia** Linn.

* **Pistia Stratiotes** Linn.; H. S. 684; B. P. ii. 1105.
v. *Takapana.*
In ponds, everywhere.

588. Cryptocoryne Fisch.

* **Cryptocoryne ciliata** Fisch.; H. S. 685; B. P. ii. 1105.
v. *Kerali.*
In muddy creeks and ditches, general.

* **Cryptocoryne spiralis** Fisch.; H. S. 685; B. P. ii. 1106.
Edges of ponds, general.

589. Typhonium Schott.

* **Typhonium trilobatum** Schott; B. P. ii. 1107. *T. orixense* H. S. 686.
v. *Ghat kachu, ghekul.*
In thickets among grass; doubtfully native.

* **Typhonium Schottii** Prain.; B. P. ii. 1108.
In grassy glades, with the preceding of which it is possibly a variety.

Typhonium inopinatum Prain; B. P. ii. 1108.
In garden ground and among grass in open glades, introduced but common; native of Indo-China.

Typhonium Roxburghii Schott; B. P. ii. 1108. *T. trilobatum* H. S. 686.
In grassy glades, introduced and very rare; native of Malaya.

* **Typhonium cuspidatum** Bl.; B. P. ii. 1108. *T. flagelliforme* H. S. 685. *Arum cuspidatum* H. S. 690.
In grassy glades, general.
Voigt also records, but doubtfully, as to the identification, *T. divaricatum* from Serampore. The record is not improbable but needs confirmation and the species intended may be one of the foregoing.

590. Amorphophallus Bl.

* **Amorphophallus campanulatus** Bl.; H. S. 686; B. P. ii. 1109.
v. *Ól.*
Cultivated everywhere and also wild in all village thickets.

* **Amorphophallus bulbifer** Bl.; B. P. ii. 1110. *Pythonium bulbiferus* H. S. 686.
v. *Amla-bela.*
In village-shrubberies, general.

591. Plesmonium Schott.

* **Plesmonium margaritiferum** Schott; B. P. ii. 1110. *Arum margaritiferum* H. S. 690.
Village shrubberies, general.

592. Alocasia Schott.

Alocasia cucullata Schott; B. P. ii. 1111. *Colocasia cucullata* H. S. 687.
v. *Bishman.*
Reported from Serampore by Voigt, but almost certainly only a cultivated plant in our area; native of Indo-China.

Alocasia indica Schott; B. P. ii. 1111. *Colocasia indica* H. S. 687.
v. *Mán kachu, mán giri.*
Cultivated about villages, everywhere; native of India.

Alocasia macrorrhiza Schott; B. P. ii. 1111. *Colocasia odora* H. S. 687.
Cultivated about villages, general; native of Indo-China.

* **Alocasia fornicata** Schott; B. P. ii. 1111. *Colocasia fornicata* H. S. 687.
v. *Salo kachu.*
Village-shrubberies and thickets, general.

593. Colocasia Linn.

* **Colocasia nymphaeifolia** Kunth; H. S. 687; B. P. ii. 1112.
v. *Sar kachu.*
Grassy glades and village shrubberies, general.

* **Colocasia antiquorum** Schott; H. S. 686; B. P. ii. 1112.
v. *Kachu.*
Everywhere cultivated and also everywhere wild in grassy glades and village-shrubberies.

594. Scindapsus Schott.

* **Scindapsus officinalis** Schott; H. S. 688; B. P. ii. 1114.
v. *Gaj pipal.*
Epiphytic in orchards and village-shrubberies; sometimes cultivated.

595. Lasia Lour.

* **Lasia heterophylla** Schott; H. S. 689; B. P. ii. 1116. *L. Loureirii* H. S. 689.
v. *Kanta kachu, kanta mán.*
Swampy places, general.

CXV.—LEMNACEÆ.

596. Lemna Linn.

* **Lemna paucicostata** Hegelm.; B. P. ii. 1117.
In stagnant water, floating, general.

* **Lemna trisulca** Linn.; B. P. ii. 1117. *L. cruciata* H. S. 692.
In stagnant water, forming tangled masses below the surface, rare.

* **Lemna polyrhiza** Linn.; B. P. ii. 1117. *L. orbiculata* H. S. 692.
In stagnant water, floating; everywhere.

* **Lemna oligorhiza** Kurz.; B. P. ii. 1117.
In stagnant water, floating; rare.

597. Wolffia Hook.

* **Wolffia arrhiza** Wimm.; B. P. ii. 1117. *Grantia globosa* H. S. 692.
In stagnant water, floating, general.

* **Wolffia microscopica** Kurz; B. P. ii. 1117. *Grantia microscopica* H. S. 692.
In stagnant water, floating.

CXVI.—ALISMACEÆ.

598. Alisma Linn.

* **Alisma reniforme** Don; B. P. ii. 1119. *A. intermedium* H. S. 680.
In pools and marshes, general.

A. intermedium is doubtfully referred by Sir J. D. Hooker in the *Flora of British India* to *A. Plantago;* the chief arguments against the suggestion are (1) that Griffith was very unlikely to have made any mistake as to the identity of *A. Plantago;* and (2) that *A. Plantago* has not so far been met with in the Gangetic delta.

* **Alisma oligococcum** F. Muell.; B. P. ii. 1119.
In pools and marshes, very rare.

599. Limnophyton Miq.

* **Limnophyton obtusifolium** Miq., B. P. ii. 1119. *Sagittaria obtusifolia* H. S. 680.
v. *Bara kat.*
In pools and marshes, general.

600. Sagittaria Linn.

* **Sagittaria sagittifolia** Linn.; H. S. 680; B. P. ii. 1120.
v. *Muya-muya, chota kat.*
Sides of ponds and ditches, general.

* **Sagittaria guayanensis** H. B. & K.; B. P. ii. 1120. *S. cordifolia* H. S. 680.
In pools and marshes, everywhere.

601. Butomopsis Kunth.

* **Butomopsis lanceolata** Kunth; B. P. ii. 1120. *Butomus lanceolatus* H. S. 679.

Wet places and rice-fields, west of river Hughli, rare.

CXVII.—NAIADACEÆ.

602. Aponogeton Thunb.

* **Aponogeton monostachyum** Linn. f.; B. P. ii. 1122. *Spathium chinense* H. S. 694.

v. *Ghachu.*

In standing water, general.

* **Aponogeton echinatum** Roxb.; B. P. ii. 1122.

In standing water, west of river Hughli, rare.

* **Aponogeton crispum** Thunb.; B. P. ii. 1122. *Spathium undulatum* H. S. 694.

In standing water, general.

603. Potamogeton Linn.

* **Potamogeton indicus** Roxb.; H. S. 694; B. P. ii. 1123.

In ponds and ditches, everywhere.

* **Potamogeton crispus** Linn.; B. P. ii. 1123. *P. tuberosus* H. S. 694.

In ponds and ditches, everywhere.

* **Potamogeton pectinatus** Linn.; B. P. ii. 1123.

Salt-lakes near Calcutta.

604. Ruppia Linn.

* **Ruppia rostellata** Koch; B. P. ii. 1124.

Salt-lakes near Calcutta; Sundribuns.

605. Najas Linn.

* **Najas indica** Cham.; H. S. 694; B. P. ii. 1125.

In deep standing water, everywhere.

Najas minor All.; B. P. ii. 1125. *N. dichotoma* H. S. 694. *N. heteromorpha* H. S. 694.

In deep standing water, everywhere.

* **Najas foveolata** A. Br.; B. P. ii. 1125.

In deep standing water, general.

* **Najas graminea** Del.; B. P. ii. 1125. *N. seminuda* H. S 694.

In deep standing water, everywhere.

Two other species, *Najas lacerata* Rendle and *Najas rigida* Griff. should be kept in view and looked for. The former is apparently plentiful in deep pools of standing water in the neighbouring district of Jessore. The latter was collected by Griffith at Serampore; it is a doubtful species, with fleshy rigid leaves, of which the original examples are not now to be found; if it be really a *Najas* it differs from all the known species in having alternate leaves.

CXVIII.—ERIOCAULEÆ.

606. Eriocaulon.

* **Eriocaulon Capillus-Naiadis** Hook. f.; B. P. ii. 1127. *E. setaceum.* H. S. 730 in part.
Serampore, (*Griffith, Voigt*), in deep standing water.

* **Eriocaulon truncatum** Ham.; B. P. ii. 1127. *E. sexangulare* H. S. 730.
Wet fields, west of the Hughli river.

* **Eriocaulon Sieboldianum** Sieb. & Zucc.; B. P. ii. 1127. *E. melaleucum* H. S. 731.
Wet fields and marshy places, general.

* **Eriocaulon luzulifolium** Mart.; B. P. ii. 1127.
Wet fields and marshy places, west of the Hughli river.

* **Eriocaulon quinqueangulare** Linn.; H. S. 730; B. P. ii. 1127. v. *Guri.*
Wet fields and marshy places, everywhere.

* **Eriocaulon trilobum** Ham.; B. P. ii. 1127. *E. argenteum* H. S. 730.
Wet fields and marshy places, west of the river Hughli.

Voigt states (H. S. 731) that in addition to the five which he enumerates, seven other species were collected in the neighbourhood of Serampore by the native gardeners attached to the garden of which he had charge. The species of this genus therefore deserve to be carefully collected and examined. One of Voigt's seven doubtless was *E. lusulifolium;* what the others may have been it is impossible to conjecture.

CXIX.—CYPERACEÆ.

607. Scleria Berg.

* **Scleria biflora** Roxb.; B. P. ii. 1133. *S. tessellata* H. S. 728.
Waste places, general.

* **Scleria lithosperma** Sw.; H. S. 728; B. P. ii. 1132.
Waste places, west of the river Hughli.

608. **Kyllinga** Rottb.

* **Kyllinga monocephala** Rottb.; H. S. 724; B. P. (*sphalmate* microcephala) ii. 1135.
v. *Swet gothubi.*
Waste places and fields, everywhere.

* **Kyllinga brevifolia** Rottb ; B. P. ii. 1135. *Cyperus dubius* H. S. 723 partly.
Waste places, everywhere.

* **Kyllinga triceps** Rottb.; H. S. 724; B. P. ii. 1135.
Waste places, general.

609. **Pycreus** Beauv.

* **Pycreus sanguinolentus** Nees.; B. P. ii. 1137. *Cyperus sanguinolentus* H. S. 721.
Wet places, general.

* **Pycreus nitens** Nees; B. P. ii. 1137. *Cyperus pulvinatus* H. S. 721.
Wet places, everywhere.

* **Pycreus polystachyus** Beauv.; B. P. ii. 1137.
Wet places south of Calcutta; Sundribuns.

610. **Juncellus** Clarke.

* **Juncellus inundatus** Clarke; B. P. ii. 1138. *Cyperus inundatus* H. S. 721.
v. *Pati.*
Wet places chiefly east of river Hughli; Sundribuns.

* **Juncellus pygmæus** Clarke; B. P. ii. 1138. *Cyperus pygmæus* H. S. 721 partly.
v. *Jalmúti.*
Damp places, everywhere.

611. **Cyperus** Linn.

* **Cyperus Cephalotes** Vahl; B. P. ii. 1141. *Anosporum monocephalum* H. S. 725.
v. *Gothubi, nirtroba.*
Floating on tanks, rare in our area.

* **Cyperus cuspidatus** H. B. K.; B. P. ii. 1141. *C. angustifolius* H. S. 722.
In damp waste places, general.

Cyperus castaneus Willd.; H. S. 722.

Reported by Voigt from Serampore; this record needs confirmation and is not very probable; the species is widespread in India, but is always rare and there are no specimens from Bengal in the Calcutta Herbarium. It is possible that the plant intended by Voigt is not true *C. castaneus* but the form of *C. cuspidatus* with chestnut-coloured fruits.

* **Cyperus flavidus** Retz; B. P. ii. 1142.
A weed of rice-fields, general.

* **Cyperus difformis** Linn.; H. S. 723; B. P. ii. 1142.
v. *Behua.*
A weed of rice-fields, general.

* **Cyperus Haspan** Linn.; B. P. ii. 1142.
A weed of rice-fields in the western parts of the Hughli district.

* **Cyperus niveus** Retz; H. S. 722; B. P. ii. 1142.
A weed of fields, west of the Hughli river.

* **Cyperus compressus** Linn.; H. S. 721; B. P. ii. 1143.
v. *Chuncha.*
A field weed, chiefly west of the river Hughli.

* **Cyperus aristatus** Rottb.; H. S. 722; B. P. ii. 1143.
A weed of fields and paths, general.

* **Cyperus Iria** Linn.; H. S. 723; B. P. ii. 1143.
v. *Bara chuncha.*
A weed of rice-fields, general.

* **Cyperus pilosus** Vahl; B. P. ii. 1143.
A common weed.

* **Cyperus procerus** Rottb.; B. P. ii. 1143.
A sedge on banks of nalas and rivers, general.

* **Cyperus distans** Linn. f.; H. S. 723; B. P. ii. 1143.
v. *Pani malanga.*
A sedge on banks of ditches and rivers, chiefly east by the river Hughli.

* **Cyperus nutans** Vahl; B. P. ii. 1144.
A sedge of wet places, general.

* **Cyperus malaccen** Lamk; B. P. ii. 1144. *Papyrus dehiscens* H. S. 724.
v. *Chumati pati.*
A tall sedge of river banks, everywhere.

* **Cyperus scariosus** R. Br.; B. P. ii. 1144. *C. pertenuis* H. S. 722.
v. *Nagar motha*
A slender sedge of the Sundribuns, also reported by Voigt from Serampore.

* **Cyperus articulatus** Linn.; B. P. 1144. *C. articulatus* VAR. *niloticus* H. S. 722.
A sedge of river banks, general.

* **Cyperus tegetiformis** Roxb.; B. P. ii. 1144. *Papyrus tegetiformis* H S. 724.
v. *Kuchkuchiya, gola methi, halaiza.*
A sedge of marshes and river banks, general. This species is sometimes termed *gola methi,* but that name is said by Voigt to be applicable only to the following.

* **Cyperus corymbosus** Rottb.; B. P. ii. 1144. *C. seminudus* H.S. 722.
v. *Gola methi.*
A sedge of marshes and river banks, general.

Cyperus tegetum Roxb.; B. P. ii. 1144. *Papyrus Pangorei* H. S. 723.
v. *Madar ketai.*
Reported from Serampore by Voigt, but this record needs confirmation, the species is common both west and north of our area.

* **Cyperus rotundus** Linn.; B P. ii. 1145. *C. hexastachyus* VAR. *communis* H. S. 722.
v. *Motha.*
A weed of fields and grassy places, everywhere.

* **Cyperus tuberosus** Rottb.; B. P. ii. 1145. *C. hexastachyus* VAR, *pendulus* H. S. 722.
A weed of fields and grassy places, general.

* **Cyperus radiatus** Vahl; B. P. ii. 1145. *C. verticillatus* H. S. 723.
v. *Burethi.*
River banks and marshes, everywhere.

* **Cyperus exaltatus** Retz; H. S. 722; B. P. ii. 1145.
River banks and marshes, general.

Cyperus digitatus Roxb.; B. P. ii. 1145. *C. racemosus* H. S. 723. *C. venustus* H. S. 723.
Reported, in two states, from Serampore by Voigt, but the records require confirmation; the species is common in Eastern Bengal.

Cyperus platyphyllus R. & S. *C. Roxburghii* H. S. 723.
v. *Gol-melanga.*

Reported, with a vernacular name, from Serampore by Voigt, but the record is quite doubtful; the species is apparently confined to the Deccan and Ceylon.

612. Mariscus Vahl.

* **Mariscus Dregeanus** Kunth; B. P. ii. 1146 *Cyperus dubius* H. S. 723 partly.
About Calcutta (*Wallich*) and Serampore (*Voigt*), but very rare in our area, and not impossibly a casual.

* **Mariscus squarrosus** Clarke; B. P. ii. 1146.
In wet places, general.

* **Mariscus paniceus** Vahl; B. P. ii. 1147.
In wet places, occasional.

* **Mariscus Sieberianus** Nees; B. P. ii. 1247. *M. cyperinus* H. S. 724.
v. *Bara gothubi.*
In wet places, everywhere.

* **Mariscus albescens** Gaud.; B. P. ii. 1147.
v. *Halaiya.*
Western Sundribuns, on muddy river banks.

* **Mariscus microcephalus** Presl; B. P. ii. 1147. *M. dilatus* H. S. 724.
In wet places, general.

* **Mariscus ferax** Clarke; B P. ii. 1147.
In wet places, east of Calcutta, rare.

613. Courtoisia Nees.

* **Courtoisia cyperoides** Nees; H. S. 724; B. P. ii. 1147.
Fields in Goghat, Western Hughli district.

614. Eleocharis R. Br.

* **Eleocharis plantaginea** R. Br.; B. P. ii. 1148. *Limnochloa plantaginea* H. S. 727. *L. tumida* H. S. 727.
v. *Chenchka.*
In shallow ponds, general.

* **Eleocharis fistulosa** Schult.; B. P. ii. 1148. *Limnochloa acutangula* H. S. 728.
In shallow ponds, general.

* **Eleocharis spiralis** R. Br.; B. P. ii. 1149.
In standing water, Western Sundribuns.

* **Eleocharis capitata** R. Br.; B. P. ii. 1149. *Eleogenus capitatus* H. S. 727.
In shallow ponds, general.

* **Eleocharis palustris** R. Br.; B. P. ii. 1149.
In shallow ponds, occasional.

615. Fimbristylis Vahl.

* **Fimbristylis monostachya** Hassk.; B. P. ii. 1152. *Abildgaardia Rottbolliana* H. S. 725.
v. *Marmari.*
In damp ground, general.

* **Fimbristylis acuminata** Vahl; B. P. ii. 1153.
In damp ground, occasional.

* **Fimbristylis polytrichoides** Vahl; B. P. ii. 1153.
v. *Talnaru.*
Wet fields mostly south of Calcutta and in the Northern Sundribun clearings.

VAR.* **halophila** Kurz; B. P. ii. 1153.
Wet open spaces in the Sundribuns, common.

* **Fimbristylis schœnoides** Vahl; H. S. 725; B. P. ii. 1153.
v. *Kesari malanga.*
Wet places, general.

* **Fimbristylis subbispicata** Nees & Meyer; B. P. ii. 1153.
Sundribun sea-face, in sand.

* **Fimbristylis squarrosa** Vahl; B. P. ii. 1153.
In damp places, occasional.

* **Fimbristylis dichotoma** Vahl; B. P. ii. 1153. *F. pallescens* H. S. 725.
In wet fields, everywhere.

* **Fimbristylis diphylla** Vahl; B. P. ii. 1153. *F. Royeniana* H. S. 725.
v. *Bara nirbishi.*
In fields and waste places, everywhere.

* **Fimbristylis aestivalis** Vahl; H. S. 725; B. P. ii. 1155.
In damp fields, everywhere.

* **Fimbristylis ferruginea** Vahl; H. S. 725; B. P. ii. 1154.
In fields and waste places, everywhere.

* **Fimbristylis argentea** Vahl; B. P. ii. 1154.
In fields, Goghat, Western Hughli district.

* **Fimbristylis tenera** Roem. & Schult.; B. P. ii. 1154. *Trichelostylis tenella* H. S. 725.
In damp places, general.

* **Fimbristylis globulosa** Kunth; B. P. ii. 1154.
In damp places, occasional.

* **Fimbristylis quinqueangularis** Kunth; B. P. ii. 1154. *Trichelostylis quinqueangularis* H. S. 726.
In wet fields, general.

* **Fimbristylis miliacea** Vahl; B. P. ii. 1155. *Trichelostylis miliacea* H. S. 726. *T. tetragona* H. S. 726.
v. *Bara javani.*
In fields and waste places, everywhere.

* **Fimbristylis complanata** Link.; B. P. ii. 1155. *Trichelostylis complanata* H. S. 726.
v. *Karatiya javani.*
In damp places, everywhere.

616. Echinolytrum Desv.

* **Echinolytrum dipsaceum** Desv.; B. P. ii. 1155.
In damp soil, general.

617. Bulbostylis Kunth.

* **Bulbostylis barbata** Kunth.; B. P. ii. 1156.
In damp soil, general.

618. Lipocarpha R. Br.

* **Lipocarpha argentea** R. Br.; B. P. ii. 1157.
In damp grassy places, occasional.

619. Fuirena Rottb.

* **Fuirena glomerata** Lamk; B. P. ii. 1158.
v. *Band kola.*
In grassy places, occasional.

620. Scirpus Linn.

* **Scirpus Michelianus** Linn.; B. P. ii. 1160. *Cyperus pygmæus* H. S. 721 partly.
v. *Chhota gothubi.*
In wet places, general.

In Voigt's *Hortus suburbanus* there is evidently a confusion under *Cyperus pygmæus* of this species and *Juncellus pygmæus*, while under *Cyperus dubius* which, by his citation as identical of the plants so named by Rottboell and Roxburgh respectively, includes *Kyllinga brevifolia* and *Mariscus Dregeanus* he gives, as the vernacular equivalent, the name usually associated with the present plant.

* **Scirpus squarrosus** Linn.; B. P. ii. 1160. *Isolepis squarrosa* H. S. 726.
v. *Guri*, *chancha marmari.*
In wet places, general.

* **Scirpus grossus** Linn. f.; B. P. ii. 1160. *Hymenochaete grossa* H. S. 727.
v. *Bara keshuria.*
In wet places, west of the river Hughli.
VAR.* **Kysoor** Clarke; B. P. ii. 1160. *Scirpus Kysoor* H. S. 727.
v. *Késur.*
In wet places, general.

* **Scirpus supinus** Linn.; B. P. ii. 1160. *Isolepis supina* H. S. 726.
In wet places, general.

Scirpus Isolepis Bœck.; B. P. ii. 1160. *Isolepis setacea* H. S. 726, not of R. Br.
Reported by Voigt from Serampore, the record is not improbable as the species has been collected in Lower Bengal by Griffith and is occasionally met with in Behar and Chota Nagpur.

* **Scirpus erectus** Poir.; B. P. ii. 1160. *S. junciformis* H. S. 727.
In wet places, general.

* **Scirpus articulatus** Linn.; B. P. ii. 1160. *Isolepis prolongata* H. S. 727. *I. articulata* H. S. 727. *I. incurvata* H. S. 727.
v. *Pappati chickha.*
In wet places, everywhere.

* **Scirpus mucronatus** Linn.; B. P. ii. 1161.
In wet places, general.

* **Scirpus maritimus** Linn. VAR. **affinis** Roth; B. P. ii. 1161.
Wet places, east of the river Hughli.

* **Scirpus triqueter** Linn. VAR. **segregata** Clarke; B. P. ii. 1161.
North-Western Sundribuns in swampy places.

* **Scirpus littoralis** Schrad.; B. P. ii. 1161.
Western Sundribuns.

CXX.—GRAMINEÆ.

621. Pennisetum Pers.

Pennisetum typhoideum Rich.; B. P. ii. 1169. *Penicillaria spicata* H. S. 703.
v. *Bajra.*
Cultivated. The Kambu millet.

* **Pennisetum setosum** Rich.; B. P. ii. 1169. *P. holcoides* H. S. 703.
v. *Shuti ghas.*
Collected at Serampore by Griffith, but not cited by Voigt as occurring there; possibly only a casual in our area as it has not been obtained again; it is common to the west of our districts.

Pennisetum borbonicum Kunth.; B. P. ii. 1169.
Collected about Serampore by Carey and about Shibpur by Kurz on the edges of fields, but probably an introduced grass only; native of Réunion.

622. Setaria Beauv.

Setaria italica Beauv.; B. P. ii. 1170. *Panicum italicum* H. S. 702. *P. macrochaetum* H. S. 702.
v. *Kangni, kangu.*
Cultivated. The Italian millet.

* **Setaria glauca** Beauv.; B. P. ii. 1170. *Panicum helvolum* H. S. 702.
v. *Pingi natchi.*
In newly made pastures and dry fields, general.

* **Setaria intermedia** R. & S.; B. P. ii. 1170.
v. *Dora-byara.*
In grassy glades, general, but never common.

* **Setaria verticillata** Beauv.; B. P. ii. 1170. *Panicum verticillatum* H. S. 702. *P. tomentosum* H. S. 702.
v. *Dora-byara.*
In grassy glades, general.
This and the preceding species are apparently not distinguished from each other by the inhabitants of our area.

623. Chamæraphis R. Br.

* **Chamæraphis spinescens** R. Br. VAR. **Brunoniana** Hook. f.; B. P ii. 1171.
Floating on ponds, general.

* **Chamæraphis gracilis** Hook. f.; B. P. ii. 1171.
Floating on ponds, 24-Pergunnahs, south-east of Calcutta.

624. Isachne R. Br.

Isachne miliacea Roth; B. P. ii. 1172. *Panicum patens* H. S. 700.
Reported from Serampore by Voigt but the record is doubtful; the grass occurs in North Bengal.

625. Oplismenus Beauv.

* **Oplismenus compositus** Beauv.; B. P. ii. 1173. *O. lanceolatus* H. S. 702.
Grassy glades, general.

* **Oplismenus Burmanni** Beauv.; H. S. 702; B. P. ii. 1173.
Grassy glades, general.

626. Axonopus Beauv.

* **Axonopus cimicinus** Beauv.; B. P. ii. 1174. *Coridochloa cimicina* H. S. 699.
Dry grassy places, in the western parts of the Hughli district.

627. Panicum Linn.

* **Panicum flavidum** Retz; H. S. 700; B. P. ii. 1176.
Waste places, roadsides, meadows, everywhere.

* **Panicum punctatum** Burm.; B. P. ii. 1177. *P. fluitans* H. S. 700.
v. *Peti nar.*
Edges of ditches and wet places, everywhere.

* **Panicum Crus Galli** Linn.; B. P. ii. 1177. *P. Crus Corvi* H. S. 702. *P. hispidulum* H. S. 702.
v. *Bara shama.*
In waste damp places, occasional.

VAR.* **stagninum** Trin.; B. P. ii. 1177. *P. stagninum* H. S. 702.
v. *Dal.*
In marshy places, general.

VAR. **frumentaceum** Trin.; B. P. ii. 1177. *Oplismenus frumentaceus* H. S. 703.
v. *Damra shama.*
Cultivated.

* **Panicum colonum** Linn.; B. P. ii. 1177. *Oplismenus colonus* H. S. 703.
v. *Shama.*
In rich pasture land, general.

* **Panicum prostratum** Lamk; B. P. ii. 1177. *P. repens* H. S. 700.
v. *Chhota jalganti.*
In cultivated land and gardens, general.

In the Flora of British India Roxburgh's *P. repens* is cited as equivalent to *P. villosum* and possibly Roxburgh included *P. villosum* and *P. prostratum* in one species. But that the *P. repens* which Roxburgh knew in the neighbourhood of Calcutta, which is also Voigt's *P. repens* and is the grass known locally as *chhota jalganti* is *P. prostratum*, and *P. prostratum* only, admits of no dispute.

Panicum muticum Forsk.; B. P. ii. 1177.
v. *Nar dal.*
Sometimes cultivated as a fodder grass about Calcutta, but now quite general and well established in a wild state in ponds and ditches; native of Africa. Evidently introduced since 1845.

* **Panicum javanicum** Poir.; B. P. ii. 1177. *P. Helopus* H. S. 701.
v. *Jalganti.*
Edges of cultivated fields, general.

* **Panicum setigerum** Retz.; H. S. 702; B. P. ii. 1178.
v. *Bara jalganti.*
In glades and opener thickets and hedges, general.

* **Panicum distachyum** Linn.; B. P. ii. 1178.
Grassy glades and borders of cultivated ground, general.

* **Panicum Kurzii** Hook. f.; B. P. ii. 1178.
Grassy glades, general.

* **Panicum Myurus** H. B. K.; B. P. ii. 1178. *P. serrulatum* H. S. 701.
v. *Damsiria.*
In ponds and marshes, chiefly west of the Hughli.

* **Panicum interruptum** Willd; H. S. 700; B. P. ii. 1178.
v. *Nardula.*
In ponds and marshes, chiefly south and east of Calcutta, but reported also from Serampore by Voigt.

* **Panicum myosuroides** R. Br.; B. P. ii. 1179. *P. curvatum* H. S. 700.
Margins of ponds and ditches, fairly general.

* **Panicum indicum** Linn.; B. P. ii, 1178.
In open grassy places, west of the river Hughli only.

Panicum miliaceum Linn.; H. S. 700; B. P. ii. 1179.
v. *Cheena.*
Very sparingly cultivated in the Hughli district.

Panicum miliare Lamk.; H. S. 700; B. P. ii. 1179.

v. *Gendula.*

Very sparingly cultivated in the western parts of the Hughli district.

* **Panicum psilopodium** Trim.; B. P. ii. 1179.

Open grassy places in the Goghat sub-division of the Hughli district.

* **Panicum trypheron** Schult.; B. P. ii. 1179. *P. Roxburghii* H. S. 01.

v. *Jupi kanka.*

In dry fields, west of the river Hughli only.

* **Panicum humile** Nees; B. P. ii. 1179.

v. *Jupi kanka.*

In dry fields, west of the river Hughli only. Appears not to be distinguished by the inhabitants from *P. trypheron*, of which it looks on casual observation much like a small form.

Panicum maximum Jacq.; B. P. ii. 1179. *P. jumentosum* H. S. 700.

Guinea Grass. Cultivated occasionally about Calcutta.

* **Panicum repens** Linn.; B. P. ii. 1179. *P. uliginosum* H. S. 700.

v. *Baranda.*

Borders of rice-fields, river banks and other wet places, everywhere.

* **Panicum proliferum** Lamk.; B. P. ii. 1179. *P. paludosum* H. S. 700.

v. *Borati, kalas nar, dalakri ghas.*

Floating on ponds and ditches, everywhere.

Panicum flavescens Sw.; B. P. ii. 1180. *P. costatum* H. S. 701.

v. *Bans pati ghas.*

In open glades about Calcutta, very plentiful. Though now one of the commonest of grasses about Calcutta this species is not a native of India; it was originally introduced from Mauritius. The name given it by the inhabitants of our districts is that used elsewhere to indicate the allied but much larger species *P. plicatum*, which does not occur in our area.

* **Panicum trigonum** Retz.; H. S. 700; B. P. ii. 1180.

About Serampore (*Voigt*) and also not uncommon about Shibpur. Though fairly frequent this grass is probably only an introduced one in our area for it has not been met with elsewhere in Bengal and has no vernacular name with us. It is common in the Deccan and occurs in Ceylon and Java.

628. **Digitaria** Lamk.

* **Digitaria sanguinalis** Scop. VAR. **ciliaris**; B. P. ii. 1181. *Panicum commutatum* H. S. 701.
v. *Makar-juli.*
In hedges and meadows, general.
VAR.* **extensa**; B. P. ii. 1181. *Panicum ægyptiacum* H. S. 701. *P. filiforme* H. S. 701.
In hedges and meadows, general.
VAR.* **pruriens**; B. P. ii. 1181. *Panicum orthum* H. S. 701.
In hedges and meadows, general.
VAR.* **debilis**; B. P. ii. 1181.
Open grassy places, west of the river Hughli.
VAR.* **Rottleri** B. P. ii. 1181.
Open grassy places, general.

* **Digitaria tenuiflora** Beauv.; B. P. ii. 1181. *Helcpus longiflorus* H. S. 699. *H. filiculmis* H. S. 699.
v. *Kanka-juriya.*
In open grassy places, everywhere.

* **Digitaria puberula** Link. *D. Royleana* B. P. ii. 1182.
In drier grassy places, general.

* **Digitaria pedicellaris** Prain; B. P. ii. 1182. *Urochloa panicoides* H. S. 701.
v. *Chitri chiriya.*
Dry fields, Goghat.

629. **Paspalum** Linn.

* **Paspalum scrobiculatum** Linn.; B. P. ii. 1182. *P. stoloniferum* (n. 2) H. S. 699. *Helopus longifolius* H. S. 699.
v. *Myna, kodu.*
In damp places, everywhere.

Paspalum conjugatum Berg.; B. P. ii. 1182.
In shady grassy places, general. Though now a common grass about Calcutta and Shibpur, this has all the appearance of being an introduced species : it was apparently unknown to Roxburgh and to Voigt: it probably came to India from tropical America.

* **Paspalum distichum** Linn.; B. P. ii. 1183.
Sundribuns; banks of Hughli as far north as Calcutta.

630. **Eriochloa** H. B. K.

* **Eriochloa polystachya** H. B. K.; B. P. ii. 1183. *Helopus annulatus* H. S. 699.
v. *Chiriya ghas.*
In damp places, general.

631. Oryza Linn.

Oryza sativa Linn.; H. S. 711; B. P. ii. 1184.

v. *Dhan.* Rice.

Cultivated everywhere in several forms, some without awns, others with awns of varying length: native of various parts of India.

VAR. * **fatua**; B. P. ii. 1184.

v. *Dhan.* Wild Rice.

Occasionally met with in the Sundribuns, but it is possible that the Sundribuns wild stock is only feral after escape and not truly wild. It is apparently always long-awned.

* **Oryza coarctata** Roxb.; B. P. ii. 1184.

v. *Dhani, harakata.*

Western Sundribuns, common.

632. Leersia Sw.

* **Leersia hexandra** Sw.; B. P. ii. 1185. *Hygrorhiza ciliata* H. S. 710.

Floating on ponds and jhils, everywhere.

633. Hygrorhiza Nees.

* **Hygrorhiza aristata** Nees; B. P. ii. 1185. *Potamochloa Retzii* H. S. 711.

v. *Jangli dal.*

Floating on ponds and jhils, general.

634. Tragus Haller.

* **Tragus racemosus** Scop.; B. P. ii. 1186.

Goghat, Western Hughli, in dry fields.

635. Perotis Ait.

* **Perotis latifolia** Ait.; H. S. 710; B. P. ii. 1185.

Dry fields, west of river Hughli, occasional.

636. Zoysia Willd.

* **Zoysia pungens** Willd.; H. S. 709; B. P. ii. 1186.

Western Sundribuns, common, also reported by Voigt from Serampore. The latter record is not altogether impossible, but it is doubtful if the conditions in the neighbourhood favour the existence of the grass there now. It is particularly abundant in half-cultivated ground about Canning Town.

637. Dimeria R. Br.

Dimeria ornithopoda Trin.; B. P. ii. 1187. *Chrysopogon filiformis* H. S. 704. *Andropogon Roxburghianus* H. S. 707.

Fields near Calcutta (*Roxburgh*) and Serampore (*Voigt*); the records require confirmation; the species is common to the west of our area.

638. Imperata Cyrill.

* **Imperata arundinacea** Cyrill.; B. P. ii. 1188. *I. cylindrica* H. S. 704.

v. *Ulu*.

Old stiff pasture land, everywhere.

639. Saccharum Linn.

* **Saccharum spontaneum** Linn.; H. S. 705; B. P. ii. 1188. *S. semi-decumbens* H. S. 705. *S. canaliculatum* H. S. 705.

v. *Khasi, khuri, khakra*.

River banks, hedges, etc., general.

Saccharum arundinaceum Retz.; B. P. ii. 1189. *S. procerum* H. S. 705.

v. *Teng*.

Reported from Serampore by Voigt; the species is occasionally planted in our area but its record in a wild state needs confirmation; it is plentiful in North Bengal and East Bengal.

Saccharum Sara Roxb.; H. S. 705. *S. arundinaceum* VAR. **ciliaris** B. P. ii. 1189.

v. *Sara, Shar*.

Occasionally cultivated in Hughli district, but not, I believe, wild in our area, though reported from Serampore by Voigt; it is common in the Upper Gangetic plain.

Saccharum officinarum Linn.; H. S. 705, B. P. ii. 1189. *S. sinense* H. S. 705.

v. *Akh, kushiar, gauna.* The pale forms are known as *Poori* and *kulloa*; the red as *kajuli*.

Cultivated generally; probably native of tropical Asia.

Saccharum fuscum Roxb.; H. S. 705; B. P. ii. 1189.

v. *Khuri, pati khuri*.

Reported from Serampore by Voigt; the record needs confirmation however: the species is common in Eastern Bengal.

Voigt gives the name *Kash* as limited to the erect rigid form of *S. spontaneum* and that of *khuri* to the semi-decumbent form of that species; he further indicates that the name for *S. fuscum* is *pati* *khuri.* But apparently now-a-days the name *khasi* is applied to both the forms of *S. spontaneum,* and so far as I can ascertain the name *khuri,* without any qualifying epithet, is restricted to *S. fuscum.*

640. Pollinia Trin.

* **Pollinia argentea** Trin.; B. P. ii. 1190. *Andropogon trispicatus* H. S. 707.

In new pasture land, occasional.

Pollinia conjugata. *Andropogon conjugatus* H. S. 707.

Serampore, according to Voigt.

This record is doubtful but deserves to be looked into. The grass in question, described by Roxburgh as *Andropogon conjugatus,* is stated by its author to be a native of Bengal, though no precise locality in Bengal is cited. He has left a coloured drawing of the species, but there is not now in Herb. Calcutta,—and the same is apparently true as regards Herb. Kew,—any specimen that agrees exactly with this figure which is clearly that of an species of *Pollinia.* Hackel suggests that the grass must be very closely allied to *P. fimbriata,* but it is clearly not that species as Hooker has shown, nor from the known distribution of *P. fimbriata* is it likely to be a form of it. There are examples of *P. articulata,* in Herb. Calcutta, that closely resemble in externals Roxburgh's figure of *Andropogon conjugatus,* but the awnless condition of the second glume of the sessile spikelets, as shown in Roxburgh's analysis, precludes the possibility of his species being referred to *P. articulata,* apart from the fact that *P. articulata,* though very common elsewhere in Bengal, does not seem to have ever been met with in our area. It is not impossible that *Andropogon conjugatus* may be a corresponding reduced state of *Pollinia argentea,* but so far no examples of that species, which was, moreover, well known to Roxburgh, have been communicated to Herb. Calcutta, bearing the necessary superficial resemblance to his drawing of *Andropogon conjugatus.*

641. Manisuris Sw.

* **Manisuris granularis** Linn. f.; B. P. ii. 1191. *Peltophorus granularis* H. S. 709.

Rather rare in dry meadows west of the river Hughli; not recorded from our area by Voigt and perhaps only a casual with us.

642. Rottboellia Linn. f.

* **Rottboellia compressa** Linn. f.; B. P. ii. 1192. *R. glabra* H. S. 709.

v. *Baksa.*

In pastures, general.

VAR. * **fasciculata** Hack. *Hemarthria compressa* H. S. 708.

v. *Pani sharu.*

Edges of pools and ditches, general.

* **Rottboellia protensa** Hack.; B. P. ii. 1192.

v. *Baksa.*

In pastures, general.

* **Rottboellia exaltata** Linn. f.; H. S. 709; B. P. ii. 1192.

v. *Bara swati.*

Waste places and near pools, general.

643. **Mnesithea** Kunth.

* **Mnesithea lævis** Kunth; B. P. ii. 1193. *Thyridostachyum perforatum* H. S. 708.

v. *Karki.*

Rich pastures, everywhere.

644. **Apluda** Linn.

* **Apluda varia** Hack. SUB.-SP. **mutica** Hack.; B. P. ii. 1194. *A. geniculata* H. S. 708.

In hedges and on river banks, general.

SUB.-SP. * **aristata** Hack.; B. P. ii. 1194. *A. aristata* H. S. 708.

v. *Chun karki.*

In hedges and waste places, west of the river Hughli.

645. **Ischæmum** Linn.

* **Ischæmum aristatum** Linn. SUB-SP. **imberbe** Hack.; B. P. ii. 1196. *I. aristatum* H. S. 708.

v. *Melencha.*

Waste places and hedges about Calcutta, general, but perhaps only introduced in our area.

* **Ischæmum rugosum** Salisb.; H. S. 708; B. P. ii. 1196.

v. *Moraro.*

Roadsides, waste places, hedges, everywhere.

Ischæmum semisagittatum Roxb.; B. P. ii. 1196. *Spodiopogon semisagittatus* H. S. 706.

Near Calcutta (*Roxburgh*) and Serampore (*Voigt*); doubtless both records are correct but there are no specimens of the grass from our area in Herb. Calcutta. The species is widespread in the Deccan, but is probably only a casual in Lower Bengal.

Ischæmum conjugatum Roxb.; B. P. ii. 1196. *Spodiopogon conjugatus* H. S. 706.

Near Calcutta (*Roxburgh*) and Serampore (*Voigt*); again both records are doubtless correct but are worth while verifying as there is no Lower Bengal specimen in Herb. Calcutta. Like the preceding species this is a Deccan grass and is almost certainly only a casual in the Gangetic delta; in Ceylon whence it has also been recorded, Trimen thinks it is only naturalised.

* **Ischæmum ciliare** Retz; B. P. ii. 1196. *Spodiopogon geniculatus* H. S. 706.

Western Hughli district in dry waste places, rare.

646. Arthraxon Beauv.

Arthraxon microphyllus Hochst.; B. P. ii. 1199.

Not uncommon in new pastures and in open grassy glades about Shibpur and Calcutta, but probably not indigenous in our area though plentiful in most parts of India, and possibly a recent introduction since it is not described by Roxburgh and is not recorded by Voigt.

647. Andropogon Linn.

Andropogon Schœnanthus Linn.; B. P. ii. 1203. *A. Martini* H. S. 707.

v. *Agya ghas, Rusa ghas.*

Cultivated in native gardens; native of India.

Andropogon nardus Linn.; B. P. ii. 1203. *A. Schœnanthus* H. S. 706.

v. *Gandha bena.*

Cultivated in native gardens; native of India.

* **Andropogon brevifolius** Sw.; B. P. ii. 1203.

Western Hughli district, rare.

* **Andropogon pertusus** Willd.; H. S. 707; B. P. ii. 1204.

Western Hughli district, common.

* **Andropogon intermedius** R. Br. VAR. **punctatus** Hook. f.; B. P. ii. 1204. *A. punctatus* H. S. 707.

v. *Gandha gurana.*

Banks of rivers and ponds, chiefly east of the river Hughli.

Andropogon Sorghum Brot.; B. P. ii. 1204. VAR. **vulgaris** Hack. *Sorghum vulgare* H. S. 704.

v. *Juar.*

Cultivated; native of S. E. Asia.

VAR. **bicolor** Hack. *Sorghum bicolor* H. S. 704.

v. *Kala deodhan.*

Cultivated; native of India.

VAR. **Roxburghii** Hack. *Sorghum saccharatum* H. S. 704.

v. *Sada deodhan.*

Cultivated; native of India.

* **Andropogon halepensis** Brot.; B. P. ii. 1204. *A. miliformis* H. S. 708.

v. *Kala mucha.*

Hedges, river banks and waste places, occasional; perhaps only a casual in our area.

* **Andropogon squarrosus** Linn. f.; B. P. ii. 1204. *A. muricatus* H. S. 706.

v. *Bena, khas khas.*

In low moist ground, general; sometimes planted deliberately in our area, *e.g.* in cleanings in the North-Western Sundribuns.

* **Andropogon aciculatus** Retz; B. P. ii. 1205. *Chrysopogon acicularis* H. S. 704.

v. *Chora kanta.*

In barren ground, everywhere.

Andropogon contortus Linn.; B. P. ii. 1205. *Heteropogon contortus* H. S. 706.

In newly laid down pastures about Calcutta, very rare. This species, though so common in most of the dry parts of India, is not recorded from our area by Voigt; the writer has only met with it on three or four occasions, always among the grasses that appear on plots of land that have been dug over and then left bare. It rarely persists for more than a couple of seasons and is undoubtedly only a casual in our area.

* **Andropogon caricosus** Linn.; B. P. ii. 1205. *Lipeocercis serrata* H. S. 705. *Heteropogon tenellus* H. S. 706. *Andropogon binatus* H. S. 708.

v. *Detara, detta.*

In the drier parts of the Hughli district and also in sandy places in the North-Western Sundribuns about Canning Town, but always rare.

* **Andropogon annulatus** Forsk.; B. P. ii. 1205.

A. scandens H. S. 707.

v. *Loari.*

In grassy glades and meadows, general but not common.

VAR. * **Bladhii** Hook. f.; B. P. ii. 1206. *A. Bladhii* H. S. 707.

v. *Loari.*

In grassy glades and meadows, everywhere.

648. **Pseudanthistiria** Hook. f.

Pseudanthistiria heteroclita Hook. f.; B. P. ii. 1206. *Anthistiria heteroclita* H. S. 708.

Pastures about Calcutta, according to Roxburgh, also at Serampore, according to Voigt; the record is doubtless accurate, but it is worth confirming, because there are no examples of the grass from our area in Herb., Calcutta. The species is a native of the Concan and Canara and it is very probably only a casual in Lower Bengal.

649. **Anthistiria** Linn.

Anthistiria ciliata Linn. f.; B. P. ii. 1207. *A. scandens* H. S. 708.

Serampore, according to Voigt, quite possibly, but the record needs confirmation; the species is common immediately to the west of our area.

Anthistiria gigantea Cav. VAR. **arundinacea** Hack.; B. P. ii. 1207. *Andropogon arundinaceus* H. S. 706.

Serampore, according to Voigt; a record that needs confirmation; the species is common in North Bengal and in East Bengal, but if it formerly existed in our area it would now seem to have disappeared.

650. **Iseilema** Hack.

* **Iseilema laxum** Hack.; B. P. ii. 1208.

Goghat, Western Hughli district in dry pastures.

651. **Zea** Linn.

Zea Mays Linn.; H. S. 709; B. P. ii. 1209.

v. *Makai, bhut.*

Cultivated; native of America.

652. **Polytoca** R. Br.

* **Polytoca barbata** Stapf; B. P. ii. 1209. *Coix barbata* H. S. 710.

v. *Kanta gurgar, gurgar.*

Rice-fields and sides of ditches, general.

653. **Coix** Linn.

* **Coix Lachryma-Jobi** Linn.; B. P. ii. 1210. *Coix Lacrima* H. S. 709.
v. *Kanch gurgar, gurgar.*
Rice-fields and sides of ditches, general.

Coix gigantea Kœnig; H. S. 710; B. P. ii. 1210.
v. *Dangagurgar.*
Reported from Serampore by Voigt; the record needs confirmation: the species is common in Chota Nagpur.

* **Coix aquatica** Roxb.; H. S. 710; B. P. ii. 1210.
v. *Jáb-gurgar.*
Floating in wet marshes and ponds, general.

654. **Aristida** Linn.

* **Aristida Adscenscionis** Linn.; B. P. ii. 1211.
Goghat, in dry pastures.

655. **Polypogon** Desf.

* **Polypogon monspeliensis** H. S. 710; B. P. ii. 1212.
Goghat, sandy river beds; not recorded from our area previously.

656. **Sporobolus** R. Br.

* **Sporobolus diander** Beauv.; H. S. 711; B. P. ii. 1213.
v. *Bena joni.*
In moist pasture land, general.

* **Sporobolus tremulus** Kunth; B. P. ii. 1213. *S. tenacissimus* H. S. 711.
v. *Pani durba.*
In moist pasture land, everywhere.

657. **Arundinella** Raddi.

* **Arundinella Wallichii** Nees; B. P. ii. 1216. *Oplismenus strictus* H. S. 703.
v. *Ganga bena.*
Goghat, Western Hughli district, in dry grassy places.

658. **Arundo** Linn.

Arundo Donax Linn.; B. P. ii. 1218. *Donax arundinaceus* VAR. *versicolor* H. S. 713. *Amphidonax bengalensis* H. S. 714. *A. bifaria* H. S. 714.
v. *Gaba nal, Unal.* Gardeners' garters.

In ditches in the vicinity of Calcutta chiefly.

The form of this grass with variagated leaves, rather a favourite plant in gardens about Calcutta, is an introduction from Europe and is a form of the European variety of this species. Voigt gives two Indian forms as occurring in our area; the first is the *Gaba nal* (*Arundo bengalensis*) which is the Bengal form of the European *Arundo Donax*; the second which Voigt terms *Unal* is the form of *Arundo Donax* characteristic of the Circar Mountains (Eastern Ghats), Roxburgh's *A. bifaria*. It is doubtful if the latter be really indigenous in our area. The difference between the two grasses is chiefly in habit, the inflorescence in *A. bengalensis* being more lax, in *A. bifaria* more compact; the distinction between the two is much like the distinction between the Teng (*Saccharum arundinaceum*) and the Shar (*Saccharum Sara*), but is less pronounced.

659. Phragmites Trin.

* **Phragmites Karka** Trin.; B. P. ii. 1209. *Amphidonax Karka* H. S. 714.
v. *Nal, durma*.
Ditches and river banks, general.

660. Eragrostis Beauv.

* **Eragrostis coarctata** Stapf; B. P. ii. 1221.
Goghat, Western Hughli district, in poor dry soil.

Eragrostis aspera Nees. *Poa paniculata* H. S. 716.
Reported from Serampore by Voigt, but the record is most improbable, as the species is confined, so far as is known, to Southern and Western India. Probably some other species is intended but there is no clue as to which.

* **Eragrostis tenella** R. & S. VAR. **plumosa** Stapf; B. P. ii. 1221.
Poa plumosa H. S. 715.
Grassy places and roadsides everywhere.
VAR. * **viscosa** Stapf; B. P. ii. 1222. *Poa viscosa* H. S. 715.
Dry grassy places, general.
VAR. * **breviculmis** Stapf; B. P. ii. 1222.
Dry grassy places, occasional.

Eragrostis interrupta Beauv. VAR. **Kœnigii** Stapf; B. P. ii. 1222.
Poa nutans H. S. 715.
In moist fields, everywhere.
VAR. * **diarrhena** Stapf; B. P. ii. 1222; *Poa diarrhena* H. S. 715.
In moist fields, general.

VAR. **tenuissima** Stapf; B. P. ii. 1222. *Poa tenella* H. S. 716.
In pasture land, general.

* **Eragrostis amabilis** W. & A.; B. P. ii. 1222. *Poa unioloides* H. S. 716.
v. *Koni.*
Dry grassy places, general.

* **Eragrostis gangetica** Steud.; B. P. ii. 1222. *Poa gangetica* H. S. 716.
River banks and moist pastures, general.

* **Eragrostis stenophylla** Hochst.; B. P. ii. 1222. *Poa elegantula* H. S. 715.
Moisture pastures, general.

* **Eragrostis major** Host; B. P. ii. 1223. *Poa Roxburghiana* H. S. 716.
Dry banks, old walls and waste ground; west of the river Hughli.

* **Eragrostis minor** Host; B. P. ii. 1223.
Waste places, occasional.

* **Eragrostis tremula** Hochst.; B. P. ii. 1223. *Poa multiflora* H. S. 716.
Goghat, in Western Hughli district; also at Serampore according to Voigt.

* **Eragrostis pilosa** Beauv.; B. P. ii. 1223. *Poa punctata* H. S. 716.
v. *Tanajiniya.*
In grassy places, chiefly west of the river Hughli.

* **Eragrostis cynosuroides** Beauv.; B. P. ii. 1223. *Poa cynosuroides* H. S. 716.
v. *Kusha.*
In dry grassy places, general.

661. Myriostachya Hook. f.

* **Myriostachya Wightiana** Hook. f.; B. P. ii. 1224.
v. *Nalai.*
Western Sundribuns; on margins of creeks.

662. Diplachne Beauv.

Diplachne fusca Beauv.; B. P. ii. 1225.

In swampy fields to the south-east of Calcutta and in the clearings of the North-Western Sundribuns, occasional; almost certainly only a casual in our area, though a common grass in usar lands in the Upper Gangetic Plain.

663. **Leptochloa** Beauv.

* **Leptochloa filiformis** R. & S.; B. P. ii. 1225. *Cynodon filiformis* H. S. 712.
v. *Chhota pini nati.*
Moist grassy places, general.

* **Leptochloa chinensis** Nees; B. P. ii. 1225. *Poa chinensis* H. S. 716.
v. *Bara pini nati.*
Moist grassy places, general.

664. **Microchloa** R. Br.

* **Microchloa setacea** R. Br.; H. S. 712; B. P. ii. 1226.
Dry banks and old walls, rare.

665. **Cynodon** Pers.

* **Cynodon dactylon** Pers.; H. S. 712; B. P. ii. 1227.
v. *Dúbh, Durba.*
Roadsides and dry grass lands, general.

666. **Chloris** Sw.

* **Chloris virgata** Sw.; B. P. ii. 1228.
Goghat, Western Hughli district, in dry grassy places.

* **Chloris barbata** Sw.; H. S. 711; B. P. ii. 1228.
In waste grassy places, everywhere.

667. **Eleusine** Gærtn.

* **Eleusine indica** Gærtn.; H. S. 713; B. P. ii. 1229.
v. *Mal ankura.*
In fields and waste places, everywhere.

Eleusine Coracana Gærtn.; H. S. 712; B. P. ii. 1229.
v. *Marua.*
Cultivated; a native of India.

* **Eleusine ægyptiaca** Desf.; B. P. ii. 1230. *Dactyloctenuim ægyptiacum* H. S. 712.
v. *Makra, makar juli.*
Waste places, roadsides, fields, everywhere.

668. **Triticum** Linn.

Triticum vulgare Linn.; H. S. 715; B. P. ii. 1231.
v. *Gehum.* Wheat.
Very occasionally sown in our area.

669. Hordeum Linn.

Hordeum vulgare Linn.; B. P. ii. 1231. *H. hexastichon* H. S. 714.
v. *Jao, jab, javo.* Barley.
Very occasionally sown in our area.

670. Bambusa Linn.

Bambusa nana Roxb.; H. S. 719; B. P. ii. 1232.
v. *Chhota bans.*
Cultivated as a hedge plant; native of China.

Bambusa Tulda Roxb.; B. P. ii. 1232. *Dendrocalamus Tulda* H. S. 718.
v. *Tulda bans, matela bans, piah bans.*
Cultivated; native of Eastern India.

Bambusa Balcooa Roxb.; B. P. ii. 1233. *Dendrocalamus Balcooa* H. S. 718.
v. *Balku bans, dhuli bans, palu bans.*
Cultivated; native of Eastern India.

Bambusa vulgaris Schrad.; B. P. ii. 1233. *Dendrocalamus Tulda* VAR. γ. H. S. 718.
v. *Bashini bans.*
Cultivated; native of Malaya.

Bambusa arundinacea Willd.; H. S. 719; B. P. ii. 1233. *B. spinosa* H. S. 719.
v. *Bans, Behar bans.*
Cultivated; native of the Circars and Orissa.

CRYPTOGAMIA.

PTERIDOPHYTA.

CXXI.—POLYPODIACEÆ.

671. Davallia Sm.

Davallia multiflora Roxb.; B. P. ii. 1241. *D. parallela* H. S. 735

Serampore, according to Voigt, but an improbable record; the species is to be found in Chota Nagpur but is not at all likely to occur in our area.

672. Adiantum Linn.

Adiantum lunulatum Burm.; H. S. 735; B. P. ii. 1243.
v. *Kali jhamp, kali jhant.*
Old walls, throughout our area, everywhere.

* **Adiantum caudatum** Linn.; H. S. 735; B. P. ii. 1243.

On old walls about Calcutta, Chandernagore, Shibpur and elsewhere, rare.

This species is not cited by Voigt as occurring in our area and is recorded by Roxburgh as having been introduced to the Calcutta garden by H. T. Colebrooke. There is a manuscript note in Herb., Calcutta, by Kurz, to the effect that though it had been collected near Shibpur by Mr. John Scott, Kurz had never met with it himself. Besides Scott's Shibpur record, however, the writer is able to add one or two from Calcutta and one from Chandernagore. There is, however, little doubt that the species should be considered in our area only an introduced or at most a casual species.

673. Pteris Linn.

* **Pteris longifolia** Linn.; B. P. ii. 1245. *P. amplectens* H. S. 735.

Waste places, general.

Pteris cretica Linn.; B. P. ii. 1245.

Cultivated and sometimes in abandoned gardens as if wild.

674. Ceratopteris Brogn.

* **Ceratopteris thalictroides** Brogn.; H. S. 736; B. P. ii. 1246.

v. *Jangli jhao.*

In wet places and marshes, general.

675. Nephrodium Rich.

* **Nephrodium unitum** Sieb.; B. P. ii. 1252. *Aspidium unitum* H. S. 734.

v. *Panka krul.*

In swampy ground, general.

* **Nephrodium aridum** Bak.; B. P. ii. 1253. *Polypodium semisagittatum* H. S. 734.

Western Sundribuns.

* **Nephrodium molle** Desv.; B. P. ii. 1253.

Waste places, occasional.

676. Nephrolepis Schott.

Nephrolepis cordifolia Presl.; B. P. ii. 1255. *Aspidium flagelliferum* H. S. 734.

Waste places, west of the river Hughli, occasional; possibly in our area only an escape.

677. Polypodium Linn.

* **Polypodium proliferum** Roxb.; H. S. 734; B. P. ii. 1257.
v. *Dapu.*
Grassy moist places and sides of ditches, general.

* **Polypodium adnascens** Sw.; B. P. ii. 1257. *P. pertusum* H. S. 734.
On trees in the Western Sundribun forests.

* **Polypodium irioides** Lamk; B. P. ii. 1258. *P. glabrum* H. S. 734.
v. *Chittea bora.*
On trees in village-shrubberies, general.

* **Polypodium quercifolium** Linn.; H. S. 734; B. P. ii. 1258.
v. *Gurúr.*
On trees in village-shrubberies, general.

678. Vittaria Sw.

* **Vittaria elongata** Sw.; B. P. ii. 1259. *Pteris angustifolia* H. S. 735.
On trees in the Sundribuns.

679. Drymoglossum Presl.

Drymoglossum piloselloides Presl; B. P. ii. 1259. *Notholaena piloselloides* H. S. 734.

Serampore, according to Voigt; the record is not impossible as the species is not uncommon on trees in the forests of the *Eastern* Sundribuns. It has not, however, been collected in the Western Sundribuns nor, since Voigt's day, has it been recorded from elsewhere in our area.

680. Hemionitis Linn.

* **Hemionitis arifolia** Bedd.; B. P. ii. 1259. *H. cordifolia* H. S. 734.
v. *Chakuliya.*
In shady groves, not uncommon.

681. Acrostichum Linn.

* **Acrostichum palustre** Bedd.; B. P. ii. 1260. *Lomaria scandens* H. S. 735.
North-Western Sundribuns, and marshy places south-east of Calcutta, climbing on trees.

* **Acrostichum aureum** Linn.; B. P. ii. 1261. *A. emarginatum* H. S. 734.

In tidal marshes south-west of Calcutta and throughout the Western Sundribuns.

CXXII.—SCHIZÆACEÆ.

682. Lygodium Sw.

Lygodium flexuosum Sw.; H. S. 737; B. P. ii. 1262.
v. *Bhut-raj.*

Recorded from Serampore by Voigt; the record is quite probable as the species is common to the west of our area.

* **Lygodium japonicum** Sw.; B. P. ii. 1262. *Ophioglossum filiforme* H. S. 737.

Hedges and thickets, general.

CXXIII.—OPHIOGLOSSACEÆ.

683. Ophioglossum Linn.

* **Ophioglossum reticulatum** Linn.; H. S. 737; B. P. ii. 1264.
v. *Ektir.*

In grassy glades, general but never common.

684. Helminthostachys Kaulf.

* **Helminthostachys zeylanica** Hook.; B. P. ii. 1264. *H. laciniata* H. S. 737.
v. *Ekbir.*

In shady places, general.

RHIZOCARPEÆ.

CXXIV.—SALVINIACEÆ.

685. Salvinia Schub.

* **Salvinia cucullata** Roxb.; H. S. 740; B. P. ii. 1265.
v. *Indur kana pana, Indurni pana.*

Floating on ponds, general.

S. natans Hoffm. (*Ulki pana* or *Juga pana*) should also be looked for, though it has not yet been definitely recorded from our area.

686. Azolla Lamk.

* **Azolla pinnata** R. Br.; B. P. ii. 1266. *Salvinia imbricata* H. S. 740.
v. *Pana.*

Rice swamps and ponds, everywhere.

CXXV.—MARSILEACAÆ.

687. Marsilea Linn.

* **Marsilea quadrifoliata** Linn.; H. S. 739; B. P. ii. 1266.
v. *Susni shak.*

Edges of ponds and ditches, everywhere.

* **Marsilea minuta** Linn.; B. P. ii. 1266.

Edges of ponds and ditches, general.

CXXVI.—ISOËTACEÆ.

688. Isoëtes Linn.

* **Isoetes coromandeliana** Linn. *I. capsularis* H. S. 738.

Serampore, *Griffith, Voigt.*

The specimens collected at Serampore by Griffith have been found by Mr. Baker to belong to *I. coromandeliana.*

CXXVII.—LYCOPODIACEÆ.

689. Lycopodium Linn.

* **Lycopodium Phlegmaria** Linn.; H. S. 738; B. P. ii. 1269.
v. *Sitahar.*

On trees in the Sundribuns, also reported by Voigt from Serampore, but the latter record requires confirmation.

CXXVIII.—SELAGINELLACEÆ.

690. Selaginella Spring.

* **Selaginella proniflora** Bak.; B. P. ii. 1270. *Lycopodium imbricatum* H. S. 738.
v. *Hatajhera.*

On damp paths, general.

Selaginella tenera Spring.

Cultivated and at times also sub-spontaneous in damp shady places near P. suburban gardens, about Chandernagore and Shibpur.

BRYOPHYTA.

CXXIX.—FISSIDENTACEÆ.

691. Fissidens Hedw.

* **Fissidens bengalensis** Hampe. *F. bryoides* H. S. 741.
Heavy soil, general.

CXXX.—CALYMPERACEÆ.

692. Calymperes Sw.

* **Calymperes tenerum** C. Muell.
On tree trunks, general.

CXXXI.—POTTIACEÆ.

693. Barbula Hedw.

* **Barbula orientalis** Willd. *B. indica* H. S. 741.
On damp soil, general.

* **Barbula gangetica** C. Muell.
On damp soil, occasional.

694. Splachnobryum C. Muell.

* **Splachnobryum indicum** C. Muell.
On old walls, especially on the lime courses between the bricks, everywhere.

CXXXII.—FUNARIACEÆ.

695. Physcomitrium Fuern.

* **Physcomitrium cyathocarpum** Mitten.
Damp soil, general.

CXXXIII.—MARCHANTIACEÆ.

696. Cyathodium Kunze.

* **Cyathodium albonitens** Schiffn.
On damp soil in gardens, general.

697. Athalamia Falc.

* **Athalamia pinguis** Falc.
On damp soil.

ALGÆ.

CXXXIV.—ZYGNEMACEÆ.

698. Spirogyra Link.

* **Spirogyra elongata** Kg.
In rice-fields, general.

* **Spirogyra nitida** Lk.
Howrah district.

* **Spirogyra Heeriana** Naegeli.
Calcutta.

CXXXV.—MESOCARPACEÆ.

699. **Mougeotia** Wittr.

* **Mougeotia affinis** Kg.
Matla, in brackish water.

CXXXVI.—PROTOCOCCACEÆ.

700. **Stomatochytrium** Cunningh.

* **Stomatochytrium Limnanthemum** Cunningh.
Endophytic in leaves of *Limnanthemum indicum*.

701. **Protococcus** Ag.

* **Protococcus cohærens** Kg.
Damp walls.

CXXXVII.—ULVACEÆ.

702. **Enteromorpha** Harv.

* **Enteromorpha intestinalis** Lk.
Salt-lakes near Calcutta.

CXXXVIII.—ULOTHRICACEÆ.

703. **Ulothrix** Kg.

* **Ulothrix pectinalis** Kg.
Ponds and marshes, Howrah district.

704. **Conferva** Lagerh.

* **Conferva bombycina** Wille.

River Hughli near Kidderpore; Botanic Garden, Shibpur, in ponds (VAR. β. **crassior** Mart).

* **Conferva antillarum** Kg.
Salt-lakes, Calcutta.

CXXXIX.—CHÆTOPHORACEÆ.

705. **Chætophora** Schrank.

* **Chætophora chlorotica** Kg.
Salt-lakes, near Calcutta.

CXL.—MYCOIDEACEÆ.

706. **Mycoidea** Cunningh.

* **Mycoidea parasitica** Cunningh.
Parasitic on leaves of *Citrus*, *Michelia*, *Orchidaceæ*, etc.

CXLI.—ŒDOGONIACEÆ.

707. **Œdogonium** Link.

* **Œdogonium scutatum** Kg.
Ponds, Howrah district.

CXLII.—CLADOPHORACEÆ.

708. **Rhizoclonium** Kg.

* **Rhizoclonium antillarum** Kg.
Matla, in brackish water.

709. **Cladophora** Kg.

* **Cladophora bengalensis** Mart.
Barrackpore.

* **Cladophora Rottleri** Kg.
Howrah.

* **Cladophora simpliciuscula** Kg.
Kidderpore, on walls submerged at high tide.

CXLIII.—CHARACEÆ.

710. **Nitella** Ag.

* **Nitella oligospira** A. Br.
Ponds, general.

* **Nitella hyalina** Ag.
Ponds, everywhere.

* **Nitella Roxburghii** A. Br.
Ponds, general.

711. **Chara** Linn.

* **Chara flaccida** A. Br.
Ponds, everywhere.

* **Chara zeylanica** Willd.
Marshes at Matla.

* **Chara fœtida** A. Br.
Ponds, general.

* **Chara verticillata** Roxb.
Ponds, general.

CXLIV.—ENCŒLIACEÆ.

712. **Encœlium,** Kg.

* **Encœlium vesicatum** Kg.
Banks of canal near Salt-lakes, Calcutta.

CXLV.—COMPSOPOGONACEÆ.

713. **Compsopogon** Montagne.

* **Compsopogon Hookeri** Montagne.
Canal banks near Calcutta salt-lakes; marshes at Matla.

CXLVI.—RHODOPHYLLIDACEÆ.

714. **Catanella** Grev.

* **Catanella Opuntia** Grev.
Salt-lakes near Calcutta; banks of river Hughli.

CXLVII.—DELESSERIACEÆ.

715. **Caloglossa** J Ag.

* **Caloglossa Leprieurii** J. Ag.
Salt-lakes near Calcutta; Kidderpore on walls covered at high tide.

716. **Delesseria** Lamouroux.

* **Delesseria bengalensis** Martens (sub *Hypoglossum*).
Matla, in tidal pools.

* **Delesseria pygmæa** Martens (sub *Hypoglossum*).
Salt-lakes, Calcutta; Baliaghat Canal.

CXLVIII.—RHODOMELACEÆ.

717. **Polysiphonia** Grev.

* **Polysiphonia rufo-lanosa** Harv.
Submerged branches in river Hughli.

* **Polysiphonia angustissima** Kg.
Salt-lakes, Calcutta.

* **Polysiphonia polychroma** Mart.
Salt-lakes, Calcutta.

718. Bostrychia Montagne.

* **Bostrychia rivularis** Harv.
Salt-lakes, near Calcutta.

CXLIX.—CERAMIACEÆ.

719. Hormoceras Kg.

* **Hormoceras flaccidum** Ag.
Salt-lakes, near Calcutta.

CL.—CHROOCOCCACEÆ.

720. Glœocapsa Kg.

* **Glœocapsa Kurziana** Mart.
Botanic Garden, Shibpur.

* **Glœocapsa rupestris** Kg.
On submerged branches, river Hughli.

721. Microcystis Kg.

* **Microcystis æruginosa** Kg.
Tanks at Shibpur.

CLI.—OSCILLATORIACEÆ.

722. Oscillatoria Vauch.

* **Oscillatoria amphibia** Ag.
On masonry steps of ghats both below and above the water line.

* **Oscillatoria antliaria** Mart.
Muddy river banks.

* **Oscillatoria Cortiana** Menengh.
In tanks.

* **Oscillatoria Froelichii** Kg.
Floating in ponds.

* **Oscillatoria Grateloupii** Bory.
Wet rice-fields.

* **Oscillatoria interrupta** Mart.
Mud of dried up ponds.

* **Oscillatoria Juliana** Menengh.
Sealdah, in drains.

* **Oscillatoria Kurziana** Mart.
Botanic Garden, Shibpur, in water in flowerpots.

* **Oscillatoria limnosa** Ag.
In tanks.

* **Oscillatoria tenerrima** Kg.
Salt-lakes, Calcutta.

* **Oscillatoria tenuis** Lyngb.
In ponds.

* **Oscillatoria versicolor** Mart.
Salt-lakes.

723. **Spirulina** Turp.

* **Spirulina oscillarioides** Turp.
Salt-lakes, Calcutta.

724. **Phormidium** Kg.

* **Phormidium oryzetorum** Mart.
Rice-fields; the commonest Alga in Lower Bengal.

* **Phormidium Lyngbyaceum** Kg.
Salt-lakes, Calcutta.

725. **Lyngbya** C. A. Ag.

* **Lyngbya crispa** Kg.
Salt-lakes, Calcutta.

* **Lyngbya circinnata** Kg.
Swamps and ponds, general.

* **Lyngbya cinerascens** Kg.
Salt-lakes, Calcutta.

* **Lyngbya solitaris** Kg.
Ponds, general.

726. **Leibleinia** Endl.

* **Leibleinia Juliana** Kg.
Salt-lakes, Calcutta.

727. **Hypheothrix** Kg.

* **Hypheothrix tenax** Mart.
Salt-lakes, Calcutta.

728. Hydrocoleum Kg.

* **Hydrocoleum Kurzii** Mart.
Muddy banks of canals, also salt-lakes.

* **Hydrocoleum Lenormandi** Mart.
Salt-lakes, Calcutta.

729. Microcoleus Desmaz.

* **Microcoleus salinus** (Kg.).
Kidderpore near Calcutta.

* **Microcoleus Lyngbyei** Kg.
Calcutta, salt-lakes.

730. Leptothrix Kg.

* **Lepotthrix subtillissima** Kg.
Damp walls, general.

* **Leptothrix mamillosa** Menengh.
Salt-lakes, Calcutta.

731. Dictyonema Ag.

* **Dictyonema fuscescens** Mart.
Stagnant pools, about Calcutta.

CLII.—NOSTOCACEÆ.

732. Nostoc Vauch.

* **Nostoc gregarium** Thuret.
Submerged in ponds.

733. Anabæna Bory.

* **Anabæna mollis** Kg.
Muddy edges of ponds, also in water.

734. Cylindrospermum Kg.

* **Cylindrospermum spirale** Kg.
Floating in ponds.

735. Hormosiphon Kg.

* **Hormosiphon coriaceus** Kg.
Banks of the river Hughli at Botanic Garden, Shibpur.

CLIII.—SCYTONEMATACEÆ.

736. Scytonema J. A. Ag.

* **Scytonema æruginco-cinereum** Kg.
Walls about Calcutta, common.

* **Scytonema aureum** Meneng.
Mud-banks of Hughli river.

* **Scytonema granulatum** Mart.
Salt-lakes, Calcutta.

* **Scytonema palmarum** Mart.
Within sheaths of palms, Botanic Garden.

* **Scytonema tomentosum** Kg.
Botanic Garden, Shibpur.

* **Scytonema Veillardi** Mart.
On walls, general.

CLIV.—STIGONEMATACEÆ.

737. Fischeria Kg.

* **Fischeria tenuis** Mart.
Damp walls with northern exposure.

CLV.—RIVULARIACEÆ.

738. Mastichonema Schwabe.

* **Mastichonema granulatum** Mart.
Stems of grasses in ponds and ditches.

* **Mastichonema cæspitosum** Kg.
Stems of *Sesbania* in ponds and ditches.

739. Rivularia C. A. Ag.

* **Rivularia Lens** Meneng.
In tanks, on *Vallisneria* leaves.

CLVI.—BACILLARIACEÆ.

740. Navicula Bory.

* **Navicula velox** Kg.
Matla in marshes.

* **Navicula cryptocephala** Kg.
Botanic Garden, Calcutta.

741. **Nitzschia** Hassal.

* **Nitzschia dissipata** Grun.
Matla, in marshes.

742. **Glœotila** Kg.

* **Glœotila concatenata** Kg.
Tanks and pools about Shibpur.

LICHENES.

743. **Pyrgidium** Nyl.

* **Pyrgidium bengalense** Nyl.
Botanic Gardens, on an old *Ravenala madascariensis*, only once met with.

744. **Ramalina** Fries.

* **Ramalina angulosa** Laus.
Botanic Garden, Shibpur.

* **Ramalina calicaris** Ach.
On trees, general.

745. **Parmelia** Fries.

* **Parmelia perlata** Ach.
Trees, general; especially on mangoes.

746. **Physcia** DC.

* **Physcia picta** Sw.
Trees, everywhere.

747. **Pyxine** Fries.

* **Pyxine Cocaes** Nyl.
On trees, general, especially on palms.

* **Pyxine Meissneri** Tuck.
On trees, general.

748. **Lecanora** Ach.

* **Lecanora aurantiaca** Lightf.
General.

* **Lecanora Encephalarti** Nyl.
Botanic Garden, Shibpur, on *Encephalartes* only.

* **Lecanora colubrina** Ach.
Botanic Garden, Shibpur.

* **Lecanora subfusca** VAR. **distans** Ach.
General.

* **Lecanora sarcopis** VAR. **subeffusa** Nyl.
Botanic Garden, Shibpur.

* **Lecanora granifera** Ach.
Botanic Garden, Shibpur.

749. **Gyrostomum** Fries.

* **Gyrostomum scyphuliferum** Ach.
Botanic Garden, Shibpur.

750. **Lecidea** Fries.

* **Lecidea carneo-lutea** Turn.
Botanic Garden, Shibpur.

* **Lecidea medialis** Tuck.
Botanic Garden, Shibpur, on *Cycas Rumphii.*

* **Lecidea propinquella** Nyl.
Botanic Garden, Shibpur.

* **Lecidea spadicea** Tuck.
Botanic Garden, Shibpur.

* **Lecidea patellarioides** Nyl.
Botanic Garden, Shibpur.

* **Lecidea triphragma** Nyl.
General.

* **Lecidea premnea** VAR. **malargyra** Nyl.
General.

751. **Opegrapha** Humb.

* **Opegrapha Martii** Nyl.
Botanic Garden, Shibpur.

* **Opegrapha varia** VAR. **pulicaris** Hoffm.
Botanic Garden, Shibpur.

* **Opegrapha vulgata** Ach.
General.

* **Opegrapha inæqualis** Fée.
Botanic Garden, Shibpur.

752. **Platygrapha** Nyl.

* **Platygrapha pallidella** Nyl.
General, especially on palm trees.

* **Platygrapha glaucomoides** Nyl.
General, on trees.

* **Platygrapha stigmatica** Krempelh.
Botanic Garden, Shibpur.

753. **Stigmatidium** Meyer.

* **Stigmatidium microcephalum** Nyl.
Botanic Garden, Shibpur, on dicotyledonous trees.

* **Stigmatidium melastigma** Nyl.
Botanic Garden, Shibpur.

754. **Arthronia** Eschw.

* **Arthronia cinnabarina** Nyl.
On trees with coarse bare branches, general.

* **Arthronia antillarum** Fée.
On dicotyledonous trees, general.

* **Arthronia impolitella** Nyl.
Botanic Garden, Shibpur.

* **Arthronia abnormis** Ach.
On dicotyledonous trees, general.

* **Arthronia circumalbicans** Nyl.
On *Pandanus* stems, occasional.

Arthronia astroidea VAR. **Swartziana** Ach.
Botanic Garden, Shibpur.

755. **Chiodecton** Ach.

* **Chiodecton heterotropum** Nyl.
Botanic Garden, Shibpur.

756. **Graphis** Ach.

* **Graphis scripta** Ach.
Frequent on bark of decayed *Pandanus*.

Two varieties VAR. **pulverulenta** Nyl. and VAR. **subvirginea** Nyl occur along with the typical form.

* **Graphis obtecta** Nyl.
General, on branches of various shrubs.

757. Glyphis Ach.

* **Glyphis cicatricosa** Ach.
Botanic Garden, Shibpur.
VAR. * **favulosa** Ach.
Botanic Garden, Shibpur.

758. Verrucaria Pers.

* **Verrucaria nitida** Schrad.
Botanic Garden, Shibpur.
* **Verrucaria libricola** Fée.
General, on trees, especially on *Bombax*.
* **Verrucaria tropica** Ach.
On dicotyledonous trees, general.
* **Verrucaria diluta** Fée.
Botanic Garden, Shibpur.
* **Verrucaria albo-atra** Krempelh.
On dicotyledonous trees, general.
* **Verrucaria majuscula** Nyl.
Botanic Garden, Shibpur.

759. Thelopsis Nyl.

* **Thelopsis inordinata** Nyl.
Botanic Garden, Shibpur.

760. Melanotheca Nyl.

* **Melanotheca indica** Nyl.
Botanic Garden, Shibpur, on *Pandanus*.

761. Trypethelium Ach.

* **Trypethelium Sprengelii** Ach.
On dicotyledonous trees, general.
* **Trypethelium pallescens** Fée.
Botanic Garden, Shibpur.
* **Trypethelium leucotrypum** Nyl.
Botanic Garden, Shibpur.

762. Lepraria Ach.

* **Lepraria flava** Ach.
On trees, general, especially on palms, such as *Areca*, *Arenga*, etc

G. I. C. P. O.—No, 2639 D. B. S. I.—31-12-1904.—450.—P. M. M.& B. N. D

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G. I. C. P. O.—No. 3920 D. B. S. I.—16-2-1905.—450.—B. N. D.

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vol. xxxvii.]

Mansonieæ, a new Tribe of the Natural Order Sterculiaceæ.

By Lt.-Col. D. Prain, I.M.S., F.R.S., F.L.S.

(Plate 10.)

Mr. F. B. Manson, of the Indian Forest Department, has of late assisted the Botanical Survey of India by the communication of material from the rich forests of Tenasserim. Among specimens sent by him to the Calcutta Herbarium are examples of a species that is of interest, in a variety of ways, alike to forestry and to botany.

The immediate occasion of the communication of these specimens has been an enquiry into the source of Kalamet, which has long been known as a scented wood held in considerable estimation by the Burmese. Except that it appears to be employed as a cosmetic by Burmese ladies, the uses to which Kalamet is put are not fully known; even as regards its use as a cosmetic details are wanting as to its preparation. There is, however, a considerable demand for the wood and its retail value varies, in Rangoon, from 12 annas to 3 rupees (=one to four shillings) per viss (= 3·0857 lbs.), apparently according to the abundance or scarcity of supplies. It is exported from Mergui pretty regularly, and the following table, furnished by Mr. Manson, exhibits the quantity and value of the exports from 1887-8 to 1902-3.

Year.	Viss.	Value.	Rate per viss.	
		rupees.	annas.	pies.
1887-88	3,800	290	1	3
1888-89	14,415	2733	3	0
1889-90	13,550	4552	5	5
1890-91	9,480	3775	6	2
1891-92	9,362	2104	3	7
1892-93	5,856	933	2	7
1893-94	12,501	3979	5	1
1894-95	7,251	1670	3	8
1895-96	15,505	5838	6	0
1896-97	16,844	7130	6	9
1897-98	8,728	4225	7	9
1898-99	9,794	3161	5	2
1899-1900 ...	9,105	2152	3	9
1900-01	1,697	1137	10	9
1901-02	3,625	1470	6	6
1902-03	5,212	1695	5	2
Average ... 1887-1903...	9,170	2928	5	2

Taking the viss at 3·0857 lbs. we have:

	lbs.	Value.	Rate per lb.
Average ... 1887-1903...	28,296	£195 2*s.*	5¼ pence.

At one time it was supposed that the source of Kalamet might prove to be an undescribed species of *Santalum*. In 1878, when the first edition of the 'Manual of Indian Timbers' was prepared, a specimen was received from Tavoy and the wood was examined by Sir D. Brandis, Mr. J. S. Gamble, and Mr. A. Smythies, who considered that it resembled Sandalwood, but that it differed from ordinary Indian Sandal (*Santalum album*, Linn.) in having more prominent medullary rays. When a second edition of the 'Manual' was being prepared, Mr. Gamble wrote to Mr. Manson, Conservator of Forests in Tenasserim, for better specimens. In response to this request Mr. Manson, in 1900, forwarded a piece of Kalamet wood, procured from the head-waters of the Theingôn Choung, near the Siamese frontier of the Mergui district. Mr. Gamble has noted that, as compared with true Sandal, this Kalamet wood is darker in colour; has larger pores somewhat concentrically arranged; broader, more prominent and fewer medullary rays; more marked annual rings; and a different scent, resembling if anything that of the Bog-Myrtle (*Myrica Gale*, Linn.) of Europe *. Mr. Gamble urged his correspondent to procure botanical specimens in order to enable the name of the tree to be determined.

Meanwhile the subject was taken up by Sir D. Brandis in a letter † in which he described his own experience of Kalamet; explained how it had, quite erroneously, been confused with Toungkalamet (*Cordia fragrantissima*, Kurz), a wood of different structure and with a different scent; and stated that he had recently received a small piece of wood from a Burmese friend, and had previously obtained specimens from Mr. J. W. Oliver, when that officer was Conservator of Forests in Upper Burma. Sir Dietrich was also anxious to clear up the identity of the tree, and asked Burmese forest officers to procure him botanical specimens.

In 1903, Mr. Manson at length succeeded in obtaining a supply of specimens of Kalamet and despatched examples to Sir D. Brandis, to Mr. Gamble, and to the Calcutta Herbarium. The specimens sent to Calcutta, which were in fruit only, were examined by Captain Gage, Curator of the Herbarium, who suggested the possibility, having regard to the structure of the fruit, that the species to which they belonged, which was obviously an undescribed one, might be referable to the Sterculiaceous genus *Tarrietia*. In communicating this opinion to Mr. Manson, the writer explained that in the absence of flowers an absolutely certain identification was impossible, and suggested that an attempt should be made to procure the material necessary to clear up the doubt.

This request, as Mr. Manson has explained in letters to Sir D. Brandis and Mr. Gamble, was one with which it was not easy to comply. The Kalamet forests are on the hills on the Siamese frontier more than a hundred miles above the old town of Tenasserim, and for the last forty miles of the journey there are no villages. Moreover, after several attempts to obtain specimens had failed, there seemed reason to believe that the flowering period of Kalamet is between the middle of March and the middle of April, precisely when, owing to the river being low, the journey is most difficult and tedious.

---

* Manual of Indian Timbers, ed. 2, p. 588.

† Indian Forester, xxvii. p. 516 (October 1901).

The specimens of wood received by Mr. Gamble were actually obtained by Mr. Manson's assistant, Mr. W. A. Hearsey, Divisional Forest Officer of Tavoy, whose report * is as follows :—"The Kalamet tree is found growing on small ridges and spurs running chiefly east and west from the main range of hills called Mawdoung, running north and south. It is found in evergreen forests associated with *Laurineæ*, *Murraya*, *Premna*, and some shrubs belonging to *Oleaceæ*, unfortunately all without flower or seed at this time of year. I measured a tree 5 ft. 6 in. in girth, but one of the guides tells me that they attain a girth of 7 ft. No green trees are ever cut down by Kalamet collectors, as the wood in a green state has a pungent and disagreeable odour and only smells fragrant after it has been lying in the forest for years. Notwithstanding the large quantities extracted annually, the supply of dead wood from windfalls is inexhaustible in these forests. I have brought specimens of dry and green wood, as well as leaves, there being no fruit or flowers at this time of the year. Another reason is that the people are afraid to cut the tree on account of *Nats* †, and I had some trouble to get the Siamese to cut them down."

A second visit to the Kalamet forests in December 1901 only yielded leaf-specimens, and it was not till August 1902 that the fruiting specimens sent to Calcutta in July 1903 were collected by Mr. Hearsey. In writing at this time to Sir D. Brandis and to Mr. Gamble, Mr. Manson said :—"I conjecture that there are at least two species of Kalamet, one with a dark-brown wood and the other of a pale golden brown, both deliciously scented. A specimen of the latter was received by me from Tavoy in September 1899. It was obtained by Mr. W. A. Hearsey from a lot which was sold in Rangoon for R 2/4 per viss (about 12 annas [one shilling] per lb.). Shortly afterwards, owing to the arrival of a large shipment from Delhi in the Straits Settlements ‡, the price went down to 12 annas per viss (about four annas [fourpence] per lb.). A piece of this was forwarded by me to Mr. Gamble in August 1900, and is one of the specimens B 4920, 4921 (probably the latter) mentioned by him on p. 588 of the second edition of the 'Manual of Indian Timbers.' A few days later I sent him a sample of the dark brown kind, bought in Rangoon at R 3 per viss (about R 1 [one shilling and fourpence] per lb.)."

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* Diary of Divisional Forest Officer, S. Tenasserim Division, for week ending 16th March, 1901.

† Demons.

‡ Possibly Deli in Sumatra.

Mr. Manson's surmise has since been confirmed. In November 1904 he sent to the Calcutta Herbarium specimens of "two species of trees, each of which is called by the Burmese Kalamet." One of the two is the species already represented by the leaf-specimens of March 1901 and the fruiting specimens of August 1902. The other is a tree with larger and differently shaped leaves, hitherto unrepresented in the Calcutta Herbarium, as to which, in the absence of flowers and fruit, all that can be said is that it differs from the first certainly specifically and possibly generically. In subsequent references the Kalamet from the Mawdoung Range, of which we have known the fruits since 1903 and of which we now know the flowers, will be spoken of as Kalamet A, the second one being referred to as Kalamet B.

The history of this enquiry illustrates the necessity for caution in relying on the incidence of the vernacular names of economic products. Besides avoiding the confusion, pointed out by Sir D. Brandis, which has taken place between Kalamet as a whole and Toungkalamet, it is necessary to distinguish between two Kalamets of Burmese origin, both as economic products and as botanical species. It is further clear that in Burmese marts the name Kalamet may be applied to a product of Malayan origin. We are not yet able to say whether the commercial distinction between "dark brown" and "golden brown" Kalamet corresponds wholly or in part with the botanical difference between Kalamet A and Kalamet B. We do not know the Malay name of the wood from the Straits Settlements which is sold in Burma as Kalamet, nor have we as yet any means of judging whether this Malayan Kalamet is the product of either of the Burmese species. These points can only be settled by local investigation both in Burma and in Malaya.

If, however, we are still unaware of the source of the Malay Kalamet, and are unable to say more of the Burmese Kalamet B than that it is quite different from the other Burmese Kalamet, the recent communication to the Calcutta Herbarium of flowering specimens fortunately enables us to deal finally with Kalamet A. These specimens have been examined at Calcutta by Mr. J. R. Drummond, who has lately been at work in the Herbarium there;

some have also been examined by the writer, with the kind help of Mr. W. B. Hemsley, in this country. Gage's suggestion that the plant is a new Sterculiad is amply confirmed; the flowers, however, show that it is not a *Tarrietia*. Drummond points out that the affinity of the plant is very close with the interesting African genus *Triplochiton*, Schum. non Alef.; so close, indeed, that it is almost a question whether the Tenasserim plant may not be referable to a marked section or subgenus of Schumann's *Triplochiton*. The points of difference between Manson's species and the species of *Triplochiton*, which are given below, are, however, very marked, and appear to warrant the treatment of the former as the type of a distinct genus. This genus is therefore dedicated to Mr. Manson, to whom we are indebted for the specimens that illustrate it, and is defined below as ***Mansonia***, J. R. Drumm.

This genus *Mansonia* possesses greater scientific interest than isolated novelties usually do. Its near ally, *Triplochiton*, Schum., was referred by the lamented Professor Schumann to the cohort *Malvales*; it differs, however, so markedly from all the other genera, except the proposed genus *Mansonia*, of that cohort, that Schumann was unable to place it in any recognised natural order. He therefore proposed [*] the recognition of a new natural order *Triplochitonaceæ* for its accommodation; this order has more recently been admitted by Mr. C. H. Wright, when describing an additional species of *Triplochiton* [†]. The writer does not find it necessary to adopt this extreme view. The two genera, *Triplochiton*, Schum., and *Mansonia*, J. R. Drumm., taken together, certainly constitute a distinct and natural group. But the characters which separate this group from all other known groups within the cohort *Malvales*, even those that are most distinctive, so clearly indicate Sterculiaceous affinities that it may easily be referred to *Sterculiaceæ*; within that order, however, it forms a distinct and hitherto unrecognized tribe, *Mansonieæ*.

The question whether the differences exhibited by Manson's tree, when compared with the known species of *Triplochiton*, are sufficiently marked to entitle it to separate generic recognition may be best settled by their enumeration. The leaves of *Triplochiton* are lobed, of *Mansonia* are undivided; bracteoles are described in Schumann's original species of *Triplochiton*, *Mansonia* has none; the calyx in *Triplochiton* is regularly 5-lobed, in *Mansonia* is spathaceous; the petals in *Triplochiton* are distinctly clawed, in *Mansonia* are not; the stamens of *Triplochiton* are a multiple of ten, and are inserted on a distinct ring at the top of the gynandrophore, those of *Mansonia* are ten only, arranged in pairs, with each pair so inserted that though, in the writer's opinion, they should be deemed uniseriate, it is not impossible to believe that they are biseriate, while a distinct apical ring is not developed; the carpels of *Triplochiton* are hidden by five wide, free, hypogynous, subscarious, contorted-imbricate staminodia, those of *Mansonia* overtop, by their long slender styles, the five similarly free and hypogynous, but narrowly lanceolate, petaloid, valvate staminodia.

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[*] Engler, Bot. Jahrb. xxviii. (1900) p. 330.

[†] Hooker, Icon. Plant. t. 2758.

These differences, though somewhat numerous, are of rather unequal value. The distinction as to leaves may be put aside as, at best, only specific; differences quite as great occur within large natural genera like *Sterculia* or *Hibiscus*. The distinction as to bracteoles does not hold even within the genus *Triplochiton* itself. The variation in number of the stamens and the difference in length of the styles also provide characters that at best are no more than specific. The more important differences are: that met with in the calyx, though the same difference in large natural genera like *Hibiscus* and *Bauhinia* is only sectional; that met with in the petals, though this again, taken by itself, is not more than sectional; that seen in the staminal insertion, which is possibly more apparent than real; and, finally, that seen in the æstivation of the staminodia. Since these staminodia supply the most striking character that is common to the two genera it might, under ordinary circumstances, be held that the differences which exist in this portion of the flower at the same time provide the most important distinction between the one genus and the other. But mere difference in size is not in itself important; and the valvate disposition of the staminodia in *Mansonia* may only be due to the accident that in this genus these organs are so narrow that overlapping in the bud is unnecessary.

On the other hand, it must be borne in mind that if a solitary important difference, such as that met with in the calyx, or that met with in the corolla, may, taken by itself, be fairly considered of sectional value, two such differences, taken together, may not unfairly be esteemed subgeneric. When to differences that may be rated as subgeneric we add a third, affecting yet another whorl of floral organs, we are induced to conclude that the sum of these differences is of generic value.

The leading points of agreement between *Triplochiton* and *Mansonia* are the deciduous calyx, the contorted-imbricate petals, the hypogynous insertion of the free filaments at the apex of a pronounced gynandrophore, the existence of a whorl of hypogynous free staminodes between the filaments and the gynæcium, and the free pluriovulate carpels, some of which subsequently develop into dry one-seeded mericarps samaroidly winged on the back.

In *Triplochiton* the calyx does not split to the base between the lobes before the organ as a whole separates from the torus; it therefore slips down and for a time persists as a loose collar on the pedicel. In *Mansonia* the calyx splits to the base along one side before the organ as a whole separates from the torus; it therefore at length falls quite away. The different appearance that results is thus accidental; in both genera the calyx as a whole ultimately separates from the torus. The scars on the torus which mark the points of insertion of the petals are small and nearly circular in *Triplochiton*, but elongated and oblique in *Mansonia*; this difference, however, is again accidental, and is due to the petals being clawed in the former genus, sessile in the latter; the essential feature is that the petals in both are contorted-imbricate. As regards both calyx and corolla, therefore, the two genera fall naturally within the cohort *Malvales*, without any clear indication as to which natural order of the cohort best accommodates them. The pronounced gynandrophore or column which intervenes between the petals and the stamens makes it, however, advisable to exclude the genera from *Malvaceæ*, in spite of the fact that, at all events in *Mansonia*, the anthers are 1-locular. They are said by Schumann to be so in one species of *Triplochiton* as well, and although in another species of *Triplochiton* they have been found by C. H. Wright* to be very peculiarly 2-locular, the writer cannot find, in a third species of *Triplochiton* from Lagos which he has examined, that the anthers have two cells. But, although the presence of 1-celled anthers in a Malval as a rule indicates that the plant is Malvaceous and not Sterculiaceous or Tiliaceous, the character is subject to too many exceptions to be accepted as a critical test. Not only are 1-celled anthers to be met with in other genera that are obviously either Tiliaceous or Sterculiaceous, in the *Bombaceæ*, which are usually included in *Malvaceæ*, it is possible to find 2-celled as well as 1-celled anthers in the same flower, and it often happens, even when the anthers are all 1-celled, that the filaments are intimately associated in pairs.

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* Hooker, Icon. Plant. t. 2758.

The staminodia which, in *Triplochiton* and *Mansonia*, are situated between the stamens and the carpels point to *Sterculiaceæ* rather than to *Tiliaceæ* as the more nearly related natural family. Their existence in the form of a corolla-like whorl of free phyllomes at the top of the gynandrophore imparts to the flower an appearance so remarkable that Schumann, as already explained, formed the opinion that we have here to deal with what is a distinct natural family. This, however, is a view that, as has been said above, it is not absolutely necessary to accept. In various Sterculiaceous genera, notably in *Sterculia* itself, there is a central column that is essentially in accord with the gynandrophore of *Triplochiton* and *Mansonia*, the only difference is that at the top of the column in *Sterculia* the anthers are sessile, at the top of the gynandrophore in *Triplochiton* and *Mansonia* they are stalked. In *Sterculia* it is true the flowers are 1-sexual, but the importance of this character is diminished by the fact that 1-sexual flowers are a constant feature in Schumann's original species of *Triplochiton* and are casually to be met with in *Mansonia*. Again, in many *Sterculiaceæ*, though not in *Sterculia* itself, the presence of petaloid staminodia is one of the most characteristic features of the flower. The genus *Pentapetes* may in particular be cited [*] as one in which the staminodia markedly resemble those of *Mansonia*. It is true that in *Pentapetes*, as in most Sterculiaceous genera where the staminodia are petaloid, these organs are united below with each other and with the stamens in a common tube. This, however, is not a universal feature; in the curious genus *Glossostemon* [†] the stamens are united to staminodia, much resembling those of *Mansonia*, which are free from each other at the base. The conditions in *Glossostemon* are therefore almost exactly intermediate between those that occur in *Mansonia* and in *Pentapetes*. The features in the andrœcium of *Triplochiton* on which

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[*] Botanical Register, t. 595.

[†] Hooker, Icon. Plant. t. 2542.

Schumann has chiefly relied in proposing his natural order *Triplochitonaceæ* are therefore only relative ones. When, on examining the gynæcium, we further find an arrangement of parts that is in complete accord with the corresponding arrangement in *Sterculia*, and a structure of fruit that, in spite of an initial difference in the number of ovules, is identical with the corresponding structure in *Tarrietia*, we are induced to believe that in *Triplochiton* and *Mansonia* we have to deal with two genera of *Sterculiaceæ*.

When we consider the position which these two genera should occupy in that order, we find that, having regard to the calyx, *Triplochiton* might be placed in any of the hitherto recognized tribes, while *Mansonia* might be excluded from all. Having regard to the corolla, either genus might be placed in any of the tribes except the *Sterculieæ*, while, having regard to the gynæcium and the fruit, *Sterculieæ* is the only tribe to which they could with propriety be referred. Along with these mutually antagonistic features in other whorls, we find in the andrœcium an arrangement that on the one hand points to the necessity for the inclusion of both genera in *Sterculiaceæ*, while on the other it excludes both from every hitherto recognized tribe. We are therefore left with no alternative but the recognition of a new tribe to accommodate them.

A question arises as to the name which this tribe should bear. As it is identical with Schumann's natural order *Triplochitonaceæ*, the proposed tribe should under ordinary circumstances be known as the *Triplochitoneæ*. But there is an objection to this name because there is an objection to Schumann's name *Triplochiton*. There is another and an older *Triplochiton*, proposed by Alefeld in 1863 for species that are at present relegated to the somewhat unwieldy genus *Hibiscus*. So long as this view holds the field, Schumann's *Triplochiton* may stand, but if Alefeld's *Triplochiton* should ever be resuscitated, Schumann's *Triplochiton* must automatically disappear. The use of the name *Triplochitoneæ* for a tribe which may at any time be deprived of its *Triplochiton* is at least awkward, and to guard against the contingency it seems desirable to employ the name *Mansonieæ*. The use of this name has another advantage; incidentally it emphasizes the view that in the group under discussion we have to deal with an entity that is probably not entitled to the taxonomic status postulated by Schumann for his order *Triplochitonaceæ*.

Mansonieæ (*Sterculiacearum* trib. nov.). Flores hermaphroditi vel nonnunquam 1-sexuales. Calyx deciduus. Petala 5, decidua. Stamina ad apicem gynophori libera. Staminodia 5, libera, carpellis alternantia. Carpella 5, libera, gynophoro elongato fulta. Fructus samaroideus, indehiscens.

TRIPLOCHITON. Calyx 5-partitus, lobis valvatis. Petala unguiculata. Stamina indefinita. Staminodia subscariosa, contorto-imbricata, carpella stylis brevibus superantia.—*Africa trop.*

MANSONIA. Calyx spathaceus, a latere fissus. Petala sessilia. Stamina 10. Staminodia petaloidea, valvata, quam carpella stylis setæformibus breviora.—*Asia trop.*

Mansonia, *J. R. Drumm.*

Flores hermaphroditi vel nonnulli 1-sexuales masculi. Calyx spathaceus, a latere fissus. Petala 5, carpellis opposita. Stamina 10, filamentis liberis ad apicem gynophori elongati inserta, ibique quasi 2-seriata sed vere per paria insertione paullum obliqua cum petalis carpellisque alternantia staminodiisque subjecta; antheræ 1-loculares. Staminodia 5, petaloidea, valvata, hypogyna, cum paribus filamentorum singulis consociata, inter stamina et carpella inserta et utrisque alternantia. Carpella 5, libera, in stylos totidem setæformes abeuntia, hisque staminodia superantia. Ovula 5–9, minuta, anatropa, ad suturam carpelli interiorem affixa. Fructus siccus, carpellorum indehiscentium liberorum sæpius 1–2 tantum maturantium, basi ovoideo inflatorum, dorso in alam falcatam productorum compositus. Semen in carpellis singulis maturis unum.—Arbor, foliis indivisis. Inflorescentia cymosa, cymis paniculam spurie terminalem formantibus.

Species 1 (*M. Gagei*, J. R. Drumm. MSS.) in silvis Birmanniæ australis incola.

MANSONIA GAGEI, *J. R. Drumm.*

Arbor, caudice circumambitu ultra metrali, ligno aromatico. *Ramuli* juniores floriferi pallidi, glabri, cortice rugosi. *Folia* sparsa, simplicia, chartacea, margine dimidio anteriore remote et obtuse serrata cæterum integra, ambitu oblongo-ovata vel ovato-lanceolata, apice obtuse acuminata, basi plus minusve cordata ibique 5-nervia, nervis imis gracilibus submarginalibus, sequentibus ramos crassiores nervi petiolum continuantis medii sub-4-jugos oppositos vel summos subalternantes simulantibus; supra intense subtus pallidiore viridia; juniora subtus pubescentia mox tamen glabrescentia, supra prope basin villis longioribus sparse obsita, cæterum glabra; 8–12 cm. longa, 3·5–5 cm. lata: petiolus ·6–1 cm. longus, glaber; stipulæ inconspicuæ, caducæ. *Inflorescentia* cymosa, cymis quasi in paniculam subterminalem aggregatis, nec tamen recte paniculata, ob rachin alabastro tandem in ramum foliosum evolvendo terminata. *Flores* hermaphroditi nonnullis 1-sexualibus masculis adjectis; alabastra ovato-acuta; pedicelli pergraciles 6–8 mm. longi, pilis stellatis sparse obsiti; bracteæ basales inconspicuæ, membranaceæ, caducæ; bracteolæ 0. *Calyx* spathaceus, sub anthesin 8 mm. longus, in latere a bracteâ averso tandem longitudinaliter fissus, mox deciduus, herbaceus, extus pilis stellatis sparse obsitus, nervis gracilibus anastomosantibus, longitudinalibus perpaucis vix tamen sepala distincta manifeste adumbrantibus additis, valde venosus. *Petala* 5, carpellis opposita, sessilia, omnino libera, oblongo-cuneata, obtusa, manifeste venosa, rubescentia, chartacea, nunc sinistrorse nunc in cyma eadem dextrorse contorto-imbricata, 7·5 mm. longa, 2·75 mm. lata, in alveolis tori linearibus obliquis inserta. *Stamina* 10, ad apicem gynophori 2·5 mm. longi, leviter 5-sulcati, præsertim in costis staminodiis oppositis, petalis carpellisque alternantibus sparse puberuli inserta, et, ob insertionem per paria obliqua filamentorum inter se liberorum, quasi 2-seriatim disposita; antheræ 1-loculares. *Staminodia* 5, petaloidea, hypogyna, valvata, lanceolata, acuta, 3·5 mm. longa, 1·5 mm. lata, inter stamina et carpella inserta, hisque petalisque alternantia. *Carpella* 5, petalis opposita, inter se libera, extus dense pubescentia, corpore 3·5 mm. longa, in stylos glabros distinctos setæformes subrecurvos 1·5 mm. longos abeuntia; ovula 5–9, minuta, anatropa, ad suturam carpelli interiorem affixa. *Fructus* siccus; carpellis maturitate 3–5 cm. longis, nunc singulis, sæpius binis, rarissime ternis, indehiscentibus, dorso in alam chartaceam falcatam 2·25 cm. longam, 1 cm. latam productis, cæterum in loculum basalem coriaceum ellipticum, 1-spermum, 8 mm. longum, 7 mm. latum, 3·5 mm. crassum inflatis. *Semen*, vix tamen maturum, nigrescens, nitidum.

BURMA: Tenasserim, in montibus Mawdoung ad fontes fluminis Theingôn Choung prope confines regionis Mergui Siamenses, *Hearsey et alii*!

The writer is indebted to Mr. J. S. Gamble for kindly supplying the subjoined note on the wood of *Mansonia Gagei.*

Note on the Wood of Mansonia Gagei.

"The wood-specimens before me consist of:—

"A. A block from an old dry log of very hard wood, heartwood only, cut in the Kalamet Forest in March 1901 by Mr. Hearsey.

"B. A round from a green tree giving bark and sapwood as well as heartwood, the round measuring 10½ inches in diameter. The bark is ⅛ in. thick and the sapwood 1¼ inches. Tree from Theingôn Choung, cut in December 1901 by Mr. Hauxwell.

"C. A book-form block, apparently from the same tree as B, but bearing a different date, June 1903.

"D. A small slab, 6 in. × 5¼ in. × ⅝ in., cut from the heartwood of a green tree about 4 ft. in girth in Wot-kyi-tal, Kalamet Forest, in March 1903.

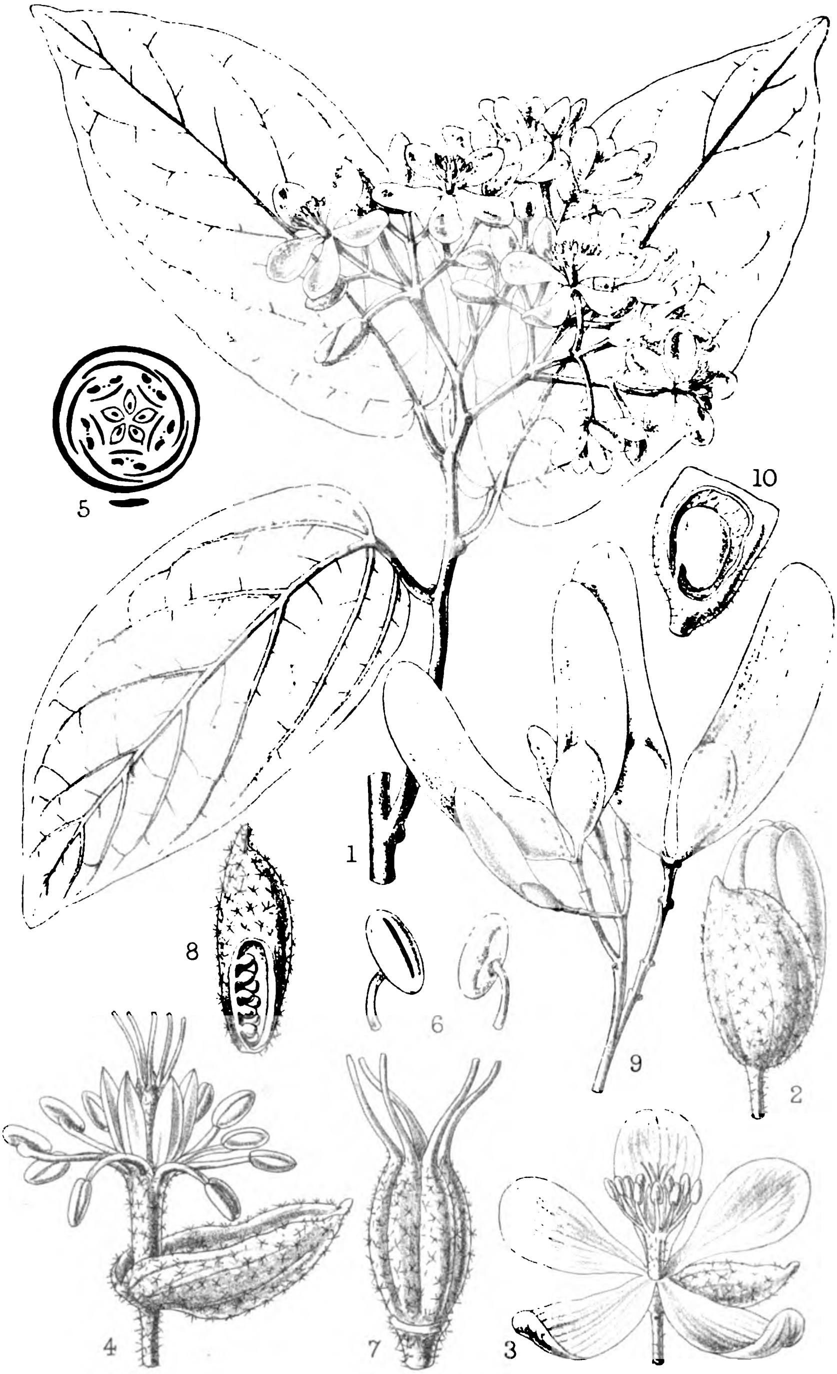
"E. Two small pieces of side-slab, bought in the Rangoon Market.

"They all appear to agree in structure, and that may thus be described:—

"*Bark* ⅛ in. thick, dark greyish brown, with shallow vertical fissures, the outer part peeling off in thin irregular flakes. *Wood* very hard, heartwood dark olive-brown, sapwood light brown; texture close and homogeneous. *Annual rings* doubtful, but rings are clearly seen though they are difficult to trace: if true annual rings, however, there are about 14 to the inch of radius, a very slow growth. *Pores* small, very numerous, arranged in more or less conspicuous, but often slightly oblique concentric lines, evenly distributed: the pores touching the adjoining medullary rays on either side. *Medullary rays* fine, very numerous, regular, long, about 300 to the inch: a radial section showing a finely-marked silver-grain. *Weight* about 70 lbs. per cubic foot."

Mr. Gamble informs the writer that the wood-specimens will be presented to the Museum at the Royal Botanic Gardens, Kew.

The drawing (Pl. 10) which accompanies this paper has, with the exception of the floral diagram, been prepared by Miss M. Smith. It will be noted that the imbrication of the petals shown in the diagram reverses the arrangement shown in the fully-opened flower (fig. 3). Both representations are correct, as both arrangements are at times to be met with in the flowers of the same cyme. That given in the diagram appears, however, to be the more usual one.



M. Smith del
J. N. Fitch lith.

West, Newman imp

MANSONIA GAGEI. *J. R. Drumm.*

EXPLANATION OF PLATE 10.

MANSONIA GAGEI, J. R. Drumm.

1. Flowering twig. 2. Flower, not fully opened, showing rupture of spathaceous calyx. 3. Fully-opened flower. 4. Flower, the petals removed, showing staminodia. 5. Floral diagram. 6. Anthers. 7. Carpels. 8. Carpel, laid open, showing ovular attachment. 9. Fruiting cyme. 10. Seed, not yet mature, *in situ*.

Figs. 1 *and* 9 *are of natural size; figs.* 2–4, 6–8, *and* 10 *are variously enlarged.*

From the Kew Bulletin of Miscellaneous Information for 1902, No. 1.

11

III.—KHASIA PATCHOULI.

(*Microtæna cymosa*, Prain.)

With Plate.

Commercial Patchouli is derived from a species of *Pogostemon* [*Kew Bulletin* for 1888, p. 78]. This plant is sparingly grown in India, and is more generally cultivated in the Malay Peninsula and Archipelago. It also occurs in the Philippines; whether it be cultivated there is not clear. It is, moreover, possible that more than one species of *Pogostemon* may be cultivated; this point it is hoped may be dealt with in a future note.

In Malaya the cultivation of Patchouli is largely in the hands of Chinese settlers. This fact may possibly explain a suggestion which has been made that China is the original home of the Patchouli-yielding *Pogostemon*. However, no *Pogostemon* with the Patchouli smell has hitherto been reported from China.

There is, however, no reason why Chinese settlers in Malaya should not be familiar with Patchouli-yielding plants, for the Patchouli odour is not confined to the genus *Pogostemon*. It is associated with more than one species of the genus *Microtæna*, the majority of which are natives of China. One species, *Microtæna robusta*, Hemsley, a native of Szechuen, where, according to a note by M. Farges, it is known as *Chi-kiang-tsao*, is employed on account of its odour much as the Patchouli imported from Malaya is used in India. Another species, *Microtæna cymosa*, Prain, of which a figure is here given, appears to be similarly used in South-Eastern China (Kwang-tung) and in various parts of Indo-China. There is also a solitary record of its occurrence in Java. It has been already referred to in the *Kew Bulletin* [1888, p. 74] under the provisional name *Plectranthus Patchouli.*

An examination of the herbarium material of this species shows that it was first collected in the Eastern Naga Hills, Assam, by Griffith about 1839, was shortly afterwards collected by Jenkins in some part, not specified, of Assam, and was again collected, in 1845, by Zollinger, in Java. No one appears to have met with it again till Clarke obtained it in 1871 in the Khasia Hills, Assam; Clarke's field note says "cultivated in Khasia and said to be the true Patchouli." In 1884 the species was collected in Kwang-tung by B. C. Henry, and in 1885 it was met with by Clarke in Manipur, a small State situated between Assam and Burma. Since then it has been obtained in Tonkin by Balansa, in the Burmese Shan States by General Collett, and in the Shan States of Siam by Lord Lamington.

The small local demand for Patchouli in Calcutta is said at one time to have been met by supplies from the Khasia Hills. The Khasia Patchouli has, however, been replaced in the Calcutta market by the Malayan article. Clarke's note of 1871 and a subsequent note by Mann, in 1887, of the occurrence of *Microtæna cymosa* as a cultivated plant in the Khasia Hills shows that the practice of growing it had long survived the loss of an outside market. The plant is not wild in the Khasia Hills, and Clarke has noted that even in Manipur he suspects that it may have been originally planted. This suspicion extends not only to the Assam records of Griffith and Jenkins, but to the Shan records of General Collett and Lord Lamington, and to one out of three records of the plant from Tonkin. There is hardly room for doubt that Zollinger's record from Java points to *M. cymosa* as an introduced species in that island; during the past 60 years it has not again been reported from Malaya.

In two Tonkin localities recorded by Balansa, the nature of his notes and the character of his specimens point to the plant being there a wild species; the same is true of some of the specimens collected in Kwang-tung by B. C. Henry, and subsequently by Ford. There is, therefore, hardly room for doubt that the isolated record of the Khasia Patchouli from Java may be explained by its introduction to that island by Chinese settlers, and there are good grounds for supposing that its occurrence in the Shan country and in Assam is due to its having spread thence as a cultivated plant from South-Western China or Tonkin.

From the Journal, Asiatic Society of Bengal, Vol. LXXIII, Part II,
No. 4, 1904.

On Dioscorea birmanica—*a new species from Burma—and two allied species.—By* D. Prain & I. H. Burkill.

[Read 3rd August, 1904.]

We find to be undescribed a yam which is in Burma, through the moister parts of that province, almost the commonest of all, so that its very abundance entitles it to attention. It is a climber in the open forests, where the rainfall is 50 inches and more, and in the 10—15 feet high scrub which often covers waste lands. It seems to avoid the densest forests; and it is quite absent from dry Central Burma where the rainfall is small.

Its distribution makes the letter Q round the dry focus of Burma, as it is common in the northern forests, common in the southern forests, is found down a connecting strip on the west in the Arakan Yomas and down another on the east in the Shan States; the tail of the letter lies in Tenasserim.

In the northern forests it grows both over bushes in the chequered shade under the tall Dipterocarps, and also climbs over bamboos and bushes getting a considerable amount of sun where the Dipterocarps no longer exist. About Katha, where red-soil forests and black-soil forests meet, it is more prevalent perhaps on the red-soil; at Bhamo it is quite common on black-soil. On the east, in the northern Shan States, it is very common about Hsipaw (Thibaw), and thence to Lashio, on red soil and black soil. Southwards we know it to occur in the state of Möngkung (Maingkaing), and about Taunggyi and Fort Stedman. On the west we know it to occur in the Gangaw valley and again near Kan on the Arakan Yomas, in the latitude of Minbu. In the south we know it to be very plentiful all along the railway line from a little south of Taungu to Nyaunglebin in the Pyinmana forests, on a yellowish-grey soil; and we know it to grow quite abundantly on the hills close to Prome. Southwards again it may be seen in the bamboo jungle which clothes any slight elevation rising above the otherwise uninterrupted stretches of rice-fields. It is readily found close to Pegu, and as near to Rangoon as Hmanwi. Towards Taungu it grows in savannah land, in the

Pyinmana forests it grows over the bushes that are mixed with teak; at Prome it grows in deciduous forest of *Ægle Marmelos*, bamboos, etc., and, as already said, it grows about Pegu in bamboo thickets.

In Tenasserim, near Moulmein, it is excessively common on laterite in 10 feet jungle of *Combretum*. To the east of Moulmein it is absent from the high evergreen forests of the Dawna range, but re-appears beyond them in the thinner forest of Thingan-nyi-naung, and continues right up to the Siamese frontier at Myawadi on a clayey grey soil.

The tuber of the plant is very woody, and has a hard skin cracking rather rectangularly like the carapace of a tortoise; in shape it is very irregular, with blunt processes lying just under the surface of the soil. Wiry roots arise from the surface, which bear low warty thorns, and dying may themselves almost constitute thorns. The flesh is yellowish-purple and unpleasant to the taste. Even the wild boars seem to leave the root altogether alone. One stem arises from each tuber, and usually bears strong prickles; at the base of each leaf in the position of stipules are two or four downwardly directed small thorns. When young the stem is pubescent; when old, with the hairs rubbed off, it becomes shining and has dark blotches on it. The leaves are very like those of *Dioscorea fasciculata*, but are larger; and the rows of prickles which generally line the main-nerves serve to distinguish them. When young they are pubescent; when old they are glabrescent, especially above. The inflorescence, which is produced in the month of May, is a long drooping spike: in the male the flowers are arranged on it in small scorpioid cymes; in the female they are solitary. This type of secondary inflorescence has hitherto never been described in any Asiatic *Dioscorea*, though there are at least two others which share the character. The young cymes are recurved; but after flowering they are found to be quite straight. The young ovaries, after flowering is over, begin to turn upwards, and long before the fruit reaches maturity have come to be parallel to the rhachis, their tips looking upwards. At maturity the fruits are imbricated, all directed away from the earth: dehiscing, they hold the seeds until some sudden puff of wind blows them away. It is when in fruit that the plant is most easily recognised; for the long spikes, sometimes over 40 cm. long, and with 40 capsules, are very conspicuous and distinctive.

The root is too woody to be fit for use as food, but we have heard of a very quaint use of it in southern Burma as a reputed antifecundative taken by the male before coition.

The plant is widely known in Burma as Hkadhkyo, pronounced Khatcho, or at Prome as Ginbeekpya; it is called Katak in the Northern Shan States.

We proceed to give a diagnosis of the plant and a list of localities.

Dioscorea birmanica. *Rhizoma* informe, horizontale hypogæum, carne luteo-livida lignosum amarum, corticis rimis testæ testitudinis similius. *Caulis* armatus, e radice singulus, in dumetis sinistrorsum ita volubilis ut sarculos ultimos tangere pedite non licet; sarculi sæpissime pubescentes, sed sarculi (præcipue vetustiores) glabri tamen nonnunquam occurruntur: caulis vetustus semper glaber. *Folia* membranacea, alterna, cordata vel late cordata sinu aperto, caudato-acuminata, vel modo caulium primo pubescentia dein supra glabrescentia vel glabra, infra ad nervos primarios spiculis recurvis armata, 11–15 cm. longa, 7·5–16 cm. lata, nervis primariis 7–11 (extremis bifurcatis) infra prominentibus supra distinctis, nervis secundariis supra infraque distinctis, reti anastomotico indistincto: petiolus pubescens vel puberulus vel glaber, armatus, 4·5–9 cm. longus. *Spicæ* dependentes, ad axillas foliorum singulæ vel binæ, 35–45 cm. longæ. *Spicæ masculæ* rhachi præter basin sterilem 1–8 cm. longam flores in cymis scorpioideis 5–10 mm. distantibus gerentes: cymæ 5–6-floræ, 1 cm. longæ, apicem spicæ versus spectantes: bracteæ bifariæ, alternæ, fere glabræ, 1–5 mm. longæ, brunneo-lineolatæ; bracteolæ 0. *Perianthii masculi* campanulati lobi marginibus exceptis externe villosi, brunneo-lineolati, exteriores lanceolati acuti cymbiformes, interiores ovati acuti marginibus retrorsi. *Stamina* 6, æqualia, perianthii lobis breviora, filamentis quam antheris longioribus. *Spicæ femineæ* flores 20–40 sessiles alternatim gerentes: bracteæ et bracteolæ adsunt. *Perianthii feminei* lobi iis floris masculi similes. *Ovarium* densissime pubescens. *Fructus* stipitatæ, stipite 4–5 mm. longo, imbricatæ, mox ad cælum versus spectantes, glabrescentes, maturæ tamen semper glabræ: alæ regulariter semiorbiculares vel irregulariter oblongæ, 2–3 cm. longæ, 10–15 mm. latæ, apice retusæ, basi truncatæ vel cuneatæ. *Semina* ala membranacea inæqualiter circumcincta.—*Dioscorea spinosa* Wall. Cat. 5103, pro parte; Hook. fil. Fl. Brit. Ind. VI. 291 pro parte; Collett and Hemsley in Journ. Linn. Soc. xxviii. (1890) p. 137.

Burma. Hukung Valley near the Assam border, *Griffith*, 5545, K.D. Bhamo District; Bhamo, on land above flood level, *Burkill* in Herb. R. E. P. 22770; hills east of Bhamo beyond Momouk, *Burkill* in Herb. R. E. P. 21520, 21546. Katha District; Katha, *Burkill* in Herb. R. E. P. 22499, 22640, 22657, 22659. Northern Shan States; Lashio, *Burkill* in Herb. R. E. P. 22534, 22578; Manpwe, *Burkill* in Herb. R. E. P. 22504; Hsipaw, *Burkill* in Herb. R. E. P. 24059, 24137; between Hsipaw and Mankang, *Burkill* in Herb. R. E. P. 24140. Southern Shan States; without precise locality, *Abdul Huq;*

Möng-Kung, 2500–4000 ft., *Craddock*, 27; Fort Stedman, *Collett*, 704; Taunggyi, *Abdul Khalil.* Pakokku District; Gangaw Valley, *Millar* in Mus. R. E. P. 20634. Minbu District; below Kan on the Yomas, *Aubert and Gage.* Prome District; hills South of Prome, *Burkill* in Herb. R. E. P. 23824. Pegu District; Kyauktaga, *Burkill* in Herb. R. E. P. 21978, 22119; Sittang side, *Kurz*, 2629; Bank of Sittang, *Kurz*, 483; Pegu town, in bamboo thickets, *Burkill* in Herb. R. E. P. 21960. Myaungmya District; Hmanwi, *Burkill.* Amherst District; Moulmein, *Wallich*, 5103 C; on the south-east of Moulmein, *Burkill* in Herb. R. E. P. 23917; Thingan-nyi-naung on the east of the Dawna range, *Burkill* in Herb. R. E. P. 24385; Myawadi on the Siamese frontier, *Burkill* in Herb. R. E. P. 24448. Tenasserim, without exact locality, *Helfer*, 5544.

A very closely allied species is found in south-west China, which we here describe.

DIOSCOREA YUNNANENSIS. *Rhizoma* deest. *Caulis* sinistrorsum volubilis, dense pubescens, teres, inarmatus (saltem quoad surculi). *Folia* membranacea, alterna, subreniformi-cordata vel cordata, sinu angustiore, apice parum acuminata, supra glabrescentia viridia, infra dense albo-pubescentia, inermia, 7–9 cm. longa, 11–12 cm. lata, nervis primariis 9–11 (extremis bifurcatis) infra distinctis supra vix distinctis, nervis secundariis supra infraque indistinctis, reti anastomotico vix visibile: petiolus dense pubescens, inermis, 3–8 cm. longus. *Spicæ* dependentes, ad axillas foliorum singulæ vel binæ, masculæ 13–20 cm. longæ, femineæ 5–20 cm. longæ. *Spicæ masculæ* rhachis præter basin sterilem 1–3 cm. longam flores in cymis scorpioidiis 4–10 mm. distantibus gerentes: cymæ 3–5-floræ, 5 mm. longæ, apicem spicæ versus spectantes; bracteæ bifariæ, alternæ, extus dense glabrescentes, intus glabræ, 1–5 mm. longæ, brunneo-lineolatæ: bracteolæ 0. *Perianthii masculi* campanulati lobi brunneo-lineolati, subæquales, ovato-acuti. *Stamina* 6, æqualia, perianthii lobis breviora; filamenta antheras subæquantia. *Spicæ femineæ* flores 6–12 sessiles alternatim gerentes; bracteæ extus dense pubescentes: bracteolas non vidimus. *Perianthii feminei* lobi iis floris masculi similes. *Ovarium* densissime pubescens, 3–6-costatum. *Fructus* maturæ ignotæ, post anthesin teste ovario gravido ad cælum versus respicientes.

CHINA: Yunnan; Mengtze, in woods at 4,600 and 5,000 feet. *A. Henry*, 9288 and 9288 A.

This species differs from *D. birmanica* in the more pubescent leaves, in the equal perianth-segments and in the filaments.

DIOSCOREA sp. Another apparently nearly related plant has been once collected by Scortechini in Perak, who gives no precise locality.

It is distinguished, as far as the sterile plant is concerned, by the main stem being densely beset with very large compound prickles which have two to six cusps. The smaller stems have simple prickles fewer and smaller than those on the main stems, but even the prickles on these are larger than the prickles usually met with in corresponding situations on *D. birmanica.* The petioles are prickly as in the Burmese plant and have the same basal stipular thorns; but the leaves themselves are rather differently shaped, being ovate-cordate, 20 cm. long by 11 cm. broad, and having no thorns on the veins: the younger leaves have hairs beneath towards the base. The plant, which is probably an undescribed species, deserves to be looked for.

From the Journal Asiatic Society of Bengal, Vol. LXXIII, Part II, Supplement, 1904.

On Dioscorea deltoidea, Wall., *Dioscorea quinqueloba,* Thunb., *and their allies.—By* D. Prain and I. H. Burkill.

In the following paper we describe eleven species of Dioscorea—three Indian, three Chinese, and five Japanese. They are all allied plants, with many characters in common: and as it may perhaps conduce to clearness, we give the common characters as a preliminary.

Characters which these Yams have in common.

I. Tubers as far as known inedible, not lying deep in the soil, at times growing like rhizomes parallel with the surface.
II. Stems always twining to the left.
III. Leaves cordate (or truncate below), constricted more or less towards the middle, or else lobed, with 5–9 palmately arranged nerves.
IV. Male flowers generally two or more together.
V. Female spikes pedulous, with recurved fruit.
VI. Wings of capsules with a tendency to be quadrate.
VII. Seeds winged all round but irregularly so, apparently distributed as from swinging censers by the movement of the flexuous slender spikes in the wind.

The species group themselves naturally in a way that more or less accords with their distribution. The first little group contains four,—

Dioscorea deltoidea, *D. sikkimensis*, *D. Prazeri*, and *D. panthaica* which are found in the lower Himalaya and mountains east of it: they are all closely allied. Next stands rather alone *D. acerifolia* from Central China. Thirdly come the three closely allied Japanese species *D. septemloba*, *D. nipponica* and *D. quinqueloba*. Lastly stand two species from Japan, *D. tenuipes* and *D. Yokusai*, associated with *D. enneaneura* from Central China. Uline, who has recently done valuable work upon the genus Dioscorea, refers some of the species to a section which he names *Stenophora;* but it is not clear to us if he would so refer all. We therefore leave undiscussed for the present the question of sections.

Dioscorea birmanica, which we described in a recent paper, is allied to the yams under discussion; but, with the horizontal inedible rhizome and dependent female inflorescences and the censer mechanism for seed distribution, it combines leaves not constricted or lobed, as well as a robustness which is foreign to all except, it may be, *D. acerifolia*; moreover none are thorny to the degree that it is, and none have precisely similar cymules of male flowers.

The following is a key to the species which we shall forthwith describe:—

Anthers not didymous:—
  Leaves quite smooth beneath:—
    Male flowers not pedicelled .. .. *Prazeri.*
    Male flowers pedicelled. .. .. *sikkimensis.*
  Leaves with hairs or papillæ beneath:—
    Male flowers sessile:—
      Male inflorescence slender, little branched .. .. *deltoidea.*
      Male inflorescence much branched, subthyrsoid .. .. *panthaica.*
    Male flowers stalked:—
      Male inflorescence long and rigid .. .. .. *acerifolia.*
      Male inflorescence slender:—
        Leaves 7-lobed, lobes acute .. .. .. *septemloba.*
        Leaves 3–5-lobed, lobes obtuse:—
          Capsule longer than wide .. .. .. *nipponica*
          Capsule as wide as long .. .. .. *quinqueloba.*
Anthers didymous:—
  Perianth segments equal .. .. *tenuipes.*
  Perianth segments unequal:—
    Male flowers in cymules, larger .. .. .. *Yokusai.*
    Male flowers solitary or in pairs, smaller .. .. *enneaneura.*

DIOSCOREA PRAZERI. *Rhizoma* crassum, aliquanto informe, parum hypogæum, venenosum, carne albo. *Caulis* e radice singulus, glaber, sinistrorsum volubilis, teretiusculus, inermis, viridis, bulbifer. *Folia* alterna, chartacea, utrinque glaberrima, subtus glauca, pellucide punctata,

late cordata vel sursum ovato-cordata, acuminata, apice minutissime mucronulata, basis sinu lato vel latissimo, margine nonnunquam plus minusve undulata, 7- vel 9-nervia, nervis extimis profunde bifidis, nervulis secondariis reticulatis utrinque distinctis, plurima 8–12 cm. longa 10–16 cm. lata, nonnunquam tamen ad 20 cm. longa lataque: petiolus glaber, sulcatus, 4–7 cm. longus. *Spicæ masculæ* simplices (rarius singulæ sæpius 2–6-næ) vel paniculatæ, axillares; flores glomerati, 2–3-ni, sessiles in rhachi trigona sparsim sed fere prorsus dispositi: pedunculus glaber: bracteæ sub ramulis panicularum lanceolatæ 3 mm. longæ, sub glomerulis florum ovato-lanceolatæ: bracteolæ ovato-acuminatæ, naviculari-concavæ. *Perianthii masculi* laciniæ ovatæ, obtusæ, subæquales et subsimiles, patentes. *Stamina* 6, æqualia, filamentis æquilonga: antheræ filamentis multo breviores. *Spicæ femineæ* axillares, solitariæ, simplices, ad 12 cm. longæ, dependentes; flores ad 10–12, sessiles, deorsum spectantes, circiter 1 cm. remoti: bracteæ et bracteolæ adsunt. *Capsulæ* sessiles, assurgentes: alæ maturæ pergamentaceæ, irregulariter subquadrato-semicirculares, 2·5 cm. longæ, 1·5 cm. latæ, stramineo-corneæ, glaucescentes. *Semina* in loculo quoque gemina, ovato-oblonga, ·85 cm. lata, 1·25 cm. longa circumcirca alata, rufo-brunnea.

NORTHERN BURMA. Upper Chindwin District: Sittaung, *Prazer*. Bhamo District: Bhamo, *Burkill* in herb. R.E.P. 21537; Momouk, east of Bhamo, *Burkill* in herb. R.E.P. 21507, 21509, 21514. Katha District: Katha, in forests on black soil, *Burkill* in herb. R.E.P. 21557, 22493, 22494, 22495, 22496, 22652, 22658, 22664, 22665.

In the districts of Bhamo and Katha this Dioscorea occurs in the forests of Dipterocarps.

DIOSCOREA SIKKIMENSIS. *Rhizoma* crassum, aliquanto informe, parum hypogæum, venenosum, carne luteo-albo. *Caulis* e radice singulus, glaber, sinistrorsum volubilis, teretiusculus, inermis, purpureo suffusus, bulbifer (an semper?). *Folia* alterna, chartacea, utrinque glaberrima, subtus læte viridia, pellucide punctata, subdeltoideo-ovato-cordata vel late cordata, acuminata, apice minutissime mucronulata, basis sinu lato vel latissimo, margine nonnunquam plus minusve undulata, 7- vel 9-nervia, nervis extimis profunde bifidis, nervulis secondariis reticulatis utrinque distinctis, plurima 9–16 cm. longa, 7–9 cm. lata nonnunquam tamen usque ad 20 cm. longa lataque: petiolus glaber, sulcatus, 4–7 cm. longus. *Spicæ masculæ* simplices, vel rarius paniculatæ, singulæ vel binæ vel ternæ, axillares: flores glomerati, 2–3-ni, breviter pedicellati, glomerulis in rhachi trigona 2–4 mm. distantibus:

pedunculus glaber: bracteæ sub ramulis panicularum lanceolatæ, 3 mm. longæ, sub glomerulis ovato-lanceolatæ pedicellos subæquantes: bracteolæ ovato-acuminatæ, naviculari-concavæ, pedicellis dimidio breviores. *Perianthii masculi* laciniæ ovatæ, subacutæ, subæquales et subsimiles, patentes. *Stamina* 6, æqualia, filamentis æquilonga: antheræ filamentis breviores. *Spicæ femineæ* axillares solitariæ, simplices, ad 12 cm. longæ, dependentes; flores ad 10–12, sessiles, deorsum spectantes, circiter 1 cm. remoti: bracteæ et bracteolæ adsunt. *Capsulæ* sessiles, assurgentes: alæ maturæ pergamentaceæ, irregulariter subquadratæ, 2 cm. longæ, 1 cm. latæ, stramineo-corneæ, livido suffusæ, glaucescentes, majores ad 2·75 cm. longæ, ad 1·6 cm. latæ. *Semina* in loculo quoque gemina, complanata, subquadrata, ·85 cm. diam., ala membranacea alba inæqualiter circumcincta.—Dioscorea deltoidea, Hook. f., Fl. Brit. Ind. VI., (1892), 291, partim.

EASTERN HIMALAYA. Sikkim: without precise locality, 1000-5000, feet, *J. D. Hooker*, No. 7, Herb. Ind. Or.; Herb. *Griffith*, 5555; Great Rungeet, 1800–2500 feet, *T. Anderson;* Rungeet Valley, *Kurz;* Rungeet, *C. B. Clarke*, 8936; Rungeet Valley, 4000 feet, *Gamble*, 9764; Dikiling, 2000 feet, *C. B. Clarke*, 9682; Naksabari, *Gamble*, 822 D; Tukwar, 3000 feet, *Gamble*, 9799; Pashok, 7000 feet, *Lister;* Mungpoo, *Hartless*, *Gammie*, *Dungboo*, 2000 feet and 3500 feet, *King;* also 600–3000 feet, *King;* Restrop, *Prain's Collector;* Silake, *Prain;* Nagree, 3000 feet, *T. Anderson;* between Richi and Rinchingpong, 2000–2500 feet, *T. Anderson.* Western Duars: *Haines*, 4187. Nepal: *Scully*, 34.

Dioscorea sikkimensis is the Kencheong or Kúkur Turul of Sikkim. It was included in *D. deltoidea* in the Flora of British India by Sir Joseph Hooker. It is indeed closely allied to that species: but it differs markedly in the absence of the short crisp simple hairs that are so abundant on the veins and nerves of the under surface of the leaf of *D. deltoidea.* There are besides other differences: the rhachis of the inflorescence in both sexes of *D. sikkimensis* is distinctly angled, while that of *D. deltoidea* in the male is terete and in the female only slightly angled: the fruit is also slightly different in shape; it is sessile and destitute of purple lines or dots in *D. sikkimensis*, while that of *D. deltoidea* is distinctly pedicelled. It is to be noted that both *D. deltoidea* and *D. sikkimensis* occur in Central Nepal, which is the eastern limit of the one and the western limit of the other.

More closely allied to *D. sikkimensis* than *D. deltoidea*, is *D. Prazeri.* The chief differences between the two are (i) in the male flowers, which in *D. Prazeri* are sessile and in *D. sikkimensis* are distinctly pedicelled, (ii) in the seeds, which are of a different colour and shape, and (iii) in the foliage which is chiefly composed of wide cordate leaves in the Burmese plant, though there are leaves on the ultimate branches which are longer than broad as is the usual condition in the Sikkim plant. In *D. sikkimensis* such leaves as there may be, which are as long as they are broad, are confined to the lower part of the main stem. The male plant of *D. Prazeri* is often bulbilliferous: this is a rare condition in *D. sikkimensis.* The bulbils of both

when present are smooth with a silvery skin: the specimen of *D. Prazeri* collected by one of us at Momouk, east of Bhamo, close to the Chinese frontier, had such silvery bulbils, slightly verrucose, and Haines notes on the ticket of his Duars specimen that it bore bulbils with a silvery smooth skin.

We have had the two species in cultivation, side by side, at the Royal Botanic Gardens, Sibpur, where they flowered simultaneously, but at the end of September the leaves of *D. Prazeri* were in full defoliation, while *D. sikkimensis* was still in vigorous growth.

DIOSCOREA DELTOIDEA, Wall. *Rhizoma* crassum, aliquanto informe, parum hypogæum, venenosum, carne albido. *Caulis* glaber, sinistrorsum volubilis, teretiusculus, inermis, viridis. *Folia* alterna, chartacea, supra glaberrima, subtus ad nervos et nervulos pilis minutis simplicibus hirtella, pellucide lineolata, basis sinu lato vel latissimo, subdeltoideo-cordato-ovata, acuminata, apice minutissime mucronulata, margine sæpissime plus minus undulata necnon aliquomodo ad medium constricta, 7-nervia, nervis extimis profunde bifidis, vel 9-nervia, nervulis secondariis reticulatis utrinque distinctis, ad 12 cm. longa, ad 10 cm. lata: petiolus glaber, sulcatus, tenuis, 4–12 cm. longus. *Spicæ masculæ* simplices vel (inferiores) compositæ, axillares; flores glomerati, 2–3-ni, sessiles, in rhachi angulata glomerulis ·5–1 cm. distantibus sparsim dispositi: pedunculus glaber, simplex ad 15 cm. longus vel maximus ad 30 cm.: bracteæ lanceolatæ, ad 2 mm. longæ: bracteolæ ovato-acuminatæ, naviculari-concavæ, glabræ, floribus dimidio breviores. *Perianthii masculi* laciniæ ovatæ, obtusæ, subæquales, patentes. *Stamina* 6, æqualia, filamentis æquilonga; antheræ filamentis multo breviores. *Spicæ femineæ* axillares, solitariæ, simplices, 8–15 cm. vel rarissime ad 25 cm. usque longæ, dependentes: flores 4–12, breviter pedicellati, deorsum spectantes, circiter 1 cm. remoti: bracteæ et bracteolæ adsunt. *Capsulæ* breviter pedicellatæ, assurgentes: alæ maturæ pergamentaceæ, vertice versus subquadratæ, basin versus rotundatæ, stramineo-corneæ, punctulis lineolisque purpureis horizontaliter notatæ, ad 3 cm. longæ, 1·6 cm. latæ. *Semina* in quoque loculo gemina, latissima, complanata, 11 mm. longa, 15–18 mm. lata, ala membranacea loculam fere implente inæqualiter circumcincta.—*Dioscorea deltoidea*, Wall. Cat. (1832), 5100; Stewart in Journ. Agric. and Hortic. Soc. Ind. XIV., (1867), p. 37; Kunth, Enum. V., (1850), 340; Hook. f., Flor. Brit. Ind. VI., (1892), 291 pro parte; Duthie in Records Bot. Survey Ind. I., (1898), 173; Lawrence, Valley of Kashmir, (1895), p. 75; Griseb. in Mart., Flor. Brasil., III., (1842), i. 43, quoad Wall. Cat., 5100, sed ref. ad Rumph. Hort. Amb., V., t. 180 exclus.

NORTH-WEST HIMALAYA. Without locality, *Stoliczka:* Herb. *Falconer*, 1116. Chitral: Ziarat, 7200 feet, *Harriss*, 16683, 16684. Dir:

Mirga, 7200 feet, *Gatacre*, 17567, 17568. Hazara district: without precise locality, but abundant in many places, 3000–6000 feet, *Stewart*; hill between Mahowa and Bojdarrah, *Stewart* in litt., l. c.; Khagan Valley, 4800 feet, *Inayat*, 20205, 20205a, *Stewart*, 603½. Kashmir: near Muliyal, *Winterbottom*, 336; Baramula, *Winterbottom*, 335; above Shapiyon, 7000 feet, *C. B. Clarke*, 28566. Chamba: between Tisa Nala and Bara, 6000 feet, *Lace*, 1881; Pangi, on the Chenab, *Brandis*; 3362; Kulal Forest in Pangi, 8000 feet, *Lace*, 1669. Kulu: Phulga, *Watt*, 13473. Simla: Gowai, 6000 feet, *Gamble*, 5140; Narkanda, *Brandis*; Chur, 8000 feet, *J. R. Drummond:* Jubal, 5000–7000 feet, *Edgeworth*. Bhaji Forest, *Kalka Pershad* in herb. R. E. P. 19065. Bashahr: Dippi, 7000 feet, *Brandis*, 3361. Jaunsar: Konam, 7000 feet, *Webb*, 153. Dehra Dhun: Mussoori, *Brandis*, 1477, *King;* Mussoori Range, *King*. Tehri-Garhwal: Ganges valley near Jhala, 8000–9000 feet, *Duthie*. British Garhwal: *King*. Kumaon: Kuntagong, 5000–8000 feet, *T. Thomson;* near Kathe, 7500 feet, and Valley of Sarju at 3500 feet, *Strachey and Winterbottom*, 1; Sujahee Devee, Puinath Village, Barchoola Ridge, *Strachey and Winterbottom*, 68; near Kupkot, 3500 feet, *Strachey and Winterbottom*, 570. Nepal: Sankas, *Wallich*, 5110.

Dioscorea deltoidea may flower very much earlier than its allies; it was collected in young fruit in the Bhaji Forests in the end of May.

Although in no places eaten as food, it is not without its uses. Sir George Watt notes on the ticket of his specimen "Roots used for washing clothes, especially wool; vern. name "Shingli": and Sir Walter Lawrence in his Valley of Kashmir, p. 75, calls it Krits, and says that the root is used as a diuretic in doses of 1 dram, and that in large doses it is a poison. E. T. Atkinson in the Gazetteer of the North-Western Provinces, X., (1882), p. 703, names a plant as *D. deltoides*, and calls it "Gun" in the vernacular: doubtless he means *D. deltoidea*. Stewart, in his Panjab Plants, (1869), p. 128, under *D. deltoidea*, gives a number of vernacular names many of which seem to belong to another widely distinct species of Dioscorea.

DIOSCOREA PANTHAICA. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, teretiusculi, ad basin petioli spinis flaccidis stipulinis obsiti, purpurei. *Folia* alterna, chartacea, supra glaberrima, subtus ad nervos et nervulos papillis minutissimis simplicibus densius hirtella, pellucide punctata, subdeltoideo-ovato-cordata, acuminata, apice minutissime mucronulata, basis sinu latissimo, margine plus minus undulata, 7-nervia, nervis extimis profunde bifidis, vel 9-nervia, nervulis secondariis reticulatis parum distinctis, 8·5 cm. longa, 6 cm. lata: petiolus glaber, sulcatus, tenuis, 5 cm. longus. *Spicæ masculæ* simplices, in paniculas axillares dispositæ; flores 2-ni in glomerulis sessilibus 4–6 mm. remotis in rhachi nonnunquam minopere angulata

ad angulas nonnunquam papilloso-lineolata dispositi: panicula 12 cm. longa: spicarum rhachides 4·5 cm. longæ: pedunculus paniculæ 3 cm. longus: bracteæ lanceolatæ, ad 1·5 mm. longæ: bracteolæ ovato-acuminatæ, naviculari-concavæ, glabræ, floribus breviores. *Perianthii masculi* laciniæ ovato-oblongæ, obtusæ, subæquales et subsimiles patentes. *Stamina* 6, æqualia, antheræ filamentis multo breviores. *Planta feminea* ignota.

South-West China. Yunnan: Mengtse, northern mountains, at 7000 feet, *A. Henry*, 11065.

This species seems to be most nearly allied to *D. deltoidea*.

Dioscorea acerifolia, Uline ex Diels. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, teretes, inermes, nigro-purpurei. *Folia* alterna chartacea, supra glaberrima, subtus ad nervos et nervulos pilis minutis nunc sparsim nunc densius hirtella, pellucide lineolata, cordato-acuminata, apice minutissime mucronulata, basis sinu latissimo, margine undulata vel sæpius palmatim sinuata vel lobata, lobis obtusis vel nonnunquam acutis, 9- vel 11-nervia, nervis extimis profunde bifidis vel trifidis, nervulis secondariis reticulatis subtus distinctis, 10–18 cm. longa, 10–12 cm. lata: petiolus apicem versus hirtellus, cæterum glaber, crassior, supra canaliculatus, 10–12 cm. longus. *Spicæ masculæ* simplices vel parum ramosæ, sæpius solitariæ, nonnunquam binæ, axillares, 20–25 cm. longæ: flores in cymulas in rhachi puberula 5–7 mm. remotas dispositi: pedunculus puberulus, 4·5–5 cm. longus: bracteæ lanceolatæ, ad 2 mm. longæ: bracteolæ ovatæ, acuminatæ, glabræ, floribus breviores. *Perianthii masculi* laciniæ ovato-oblongæ, obtusæ, subæquales, patentes. *Stamina* 6, æqualia; antheræ filamentis paullo breviores. *Spicæ femineæ* axillares, solitariæ, simplices, 16–20 cm. longæ, dependentes; flores 30–40, sessiles, deorsum spectantes, circa ·75 cm. remoti: bracteæ et bracteolæ adsunt. *Capsulæ* sessiles, assurgentes: alæ maturæ pergamentaceæ, basin versus rotundatæ, apice parum retusæ, stramineæ, purpüreo notatæ, 2 cm. longæ, 8 cm. latæ. *Semina* in loculo quoque gemina, obovata, complanata, ala membranacea alba irregulariter circumcincta. *Dioscorea acerifolia*, Uline ex Diels in Engl. Bot. Jahrb. XXIX., (1900), 261. *D. quinqueloba*, C. H. Wright, in Journ. Linn. Soc. Bot. XXXI, (1903), 92 (syn. excl.).

Central China. Hupeh: without precise locality, *A. Henry*, 150. Chienshih, *A. Henry*, 5870; Patung, *A. Henry*, 7358.

Wright, uniting *D. acerifolia* and *D. quinqueloba*, adds to the above localities some in northern China: we are unable to state to which of the two species these northern specimens belong. Diels adds to Dr. Henry's localities in Central China

"Nanshan, *Rosthorn*, 2128": and he further describes a variety, naming it var. *Rosthornii*, also from Nanshan, in the following words:—"foliis amplis acutissime acuminatis subtus ad nervos albo-setulosis ideoque cinerascentibus."

DIOSCOREA SEPTEMLOBA, Thunb. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, teretes, inermes, virides. *Folia* alterna, tenuiter chartacea, supra glaberrima, subtus ad nervulos minute papillosa, opaca nec pellucide lineolata, ex siccitate brunnea, cordata, acuminata, apice minutissime mucronulata, basis sinu lato, margine septemloba lobis basalibus obtusis sed cæteris subacutis vel acutis, 7-nervia, nervis extimis profunde bifidis, nervulis secondariis reticulatis subtus distinctis sursum obscuris, 10 cm. longa, 12 cm. lata. *Spicæ masculæ* ignotæ. *Spicæ femineæ* axillares, solitariæ, simplices, 8–10 cm. longæ, dependentes; flores 10–12, sessiles, circiter 1 cm. remoti: bracteæ fructu maturo late ovatæ: bracteolæ ovatæ, acuminatæ. *Capsulæ* sessiles, assurgentes, colore cupreæ: alæ maturæ pergamentaceæ, basin versus attenuatæ, apice rotundato-truncatæ, 2 cm. longæ, 1·2 cm. latæ, castaneæ. *Semina* in quoque loculo gemina, obovata, complanata, ala membranacea alba inæqualiter circumcincta. *Dioscorea septemloba*, Thunb., Fl. Jap., (1784), 149. *D. quinqueloba*, Franchet et Savatier, Enum. Flor. Jap., II., (1879), 46.

CENTRAL JAPAN. Island of Nippon: Joshu (Hitachi); Yubiso, *Makino*.

Makino gives the Japanese name as Momiji-dokoro on the label of a herbarium specimen kindly sent to us from the Hongkong Herbarium by Mr. S. T. Dunn.

DIOSCOREA NIPPONICA, Makino. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, teretes, inermes, virides. *Folia* alterna, chartacea, supra glaberrima, subtus ad nervos et nervulos pilis albis simplicibus hirtella, opaca nec pellucide lineolata, subdeltoideo-cordato-ovata, acuminata, apice minutissime mucronulata, basis sinu lato, margine undulata vel parum 5–7-lobata, lobis rarissime subacutis, 7–9-nervia, nervis extimis bifidis, nervulis secondariis supra obscuris subtus subdistinctis, 7–10 cm. longa, 5–10 cm. lata: petiolus apicem versus hirtellus, cæterum glaber, gracilis, supra canaliculatus, 4–8 cm. longus. *Spicæ masculæ* ignotæ. *Spicæ femineæ* axillares, simplices, singulæ, 15–25 cm. longæ, dependentes: flores 25–30, sessiles, deorsum spectantes, 5–8 mm. remoti: bracteæ lineari-lanceolatæ, acutissimæ: bracteolæ similes, minores. *Capsulæ* sessiles, assurgentes, stramineæ, purpureo-punctatæ: alæ maturæ semiovatæ, apice retusæ, basin versus attenuatæ vel rotundatæ, stramineæ, 2 cm. longæ, ·6–·7 cm. latæ. *Semina* in quoque loculo gemina, ovata, complanata, ala membranacea alba inæqualiter circumcincta.

Dioscorea nipponica Makino, Illustr. Flor. Jap., I., (? 1891) No. 1 (not seen).

CENTRAL JAPAN. Island of Nippon: Joshu (Hitachi); Schimizu-toge, *Makino.*

Makino gives the Japanese name as Uchiwa dokoro on the label of a herbarium specimen kindly sent to us by Mr. S. T. Dunn from the Hongkong Herbarium. Besides this specimen we have seen a coloured drawing of the fruit made by Mr. Makino.

DIOSCOREA QUINQUELOBA, Thunb. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, teretes, inermes, virides. *Folia* alterna, tenuiter chartacea, supra glaberrima, subtus nonnunquam ad nervos et nervulos pilis minutis simplicibus hirtella, pellucido lineolata, cordata, acuminata, apice minutissime mucronulata, basis sinu lato, infima septem-, rare novem-, loba, media quinqueloba, superiora triloba vel sinuata, 7-nervia, nervis extimis profunde bifidis, nervulis secondariis reticulatis utrinque distinctis, 6–8 cm. longa, 5–10 cm. lata: petiolus glaber, canaliculatus, 3–7 cm. longus. *Spicæ masculæ* simplices vel ramosæ, solitariæ vel binæ, axillares, 4–6 cm. longæ pedunculo ·5–1·0 cm. longo incluso: flores pedicellati, in cymulis ·3–·4 cm. remotis dispositi: rhachis pedunculusque glabri: bracteæ lanceolatæ, 1·5 mm. longæ: bracteolæ ovatæ, acutæ, glabræ, floribus breviores. *Perianthii masculi* laciniæ ovatæ, obtusæ, subæquales, patentes. *Stamina* 6, æqualia: antheræ filamentis multo longiores. *Spicæ femineæ* axillares, solitariæ vel geminæ, simplices, 10–12 cm. longæ, dependentes; flores 10–12, breviter pedicellati, deorsum spectantes, circa ·75 cm. remoti: bracteæ et bracteolæ adsunt. *Capsulæ* assurgentes: alæ maturæ pergamentaceæ, basin versus rotundatæ, apice truncatæ, 1·75 cm. longæ, ·7 cm. latæ, stramineæ. *Semina* in quoque loculo gemina, latissima, complanata, ala membranacea alba inæqualiter circumcincta. — *Dioscorea quinqueloba*, Thunb. Flor. Jap., (1784), 150; Kæmpfer, Ic. Sel., (1791), t. 15 (a satisfactory picture), Somoku Dusets, 2nd. ed., XX., t. 54.

SOUTHERN JAPAN. Island of Kiusiu, Nagasaki, *Buerger*, *Oldham* 890, *Maximowicz.*

The Japanese name as given in the Somoku Dusets is Kikuba Dokoro.

DIOSCOREA TENUIPES, Franchet et Savatier. *Radix* nobis ignota, teste Franchetio Savatieroque tuberosa et depresso-globosa. *Caules* glabri, sinistrorsum volubiles, teretiusculi, juniores minopere angulati, inermes, virides. *Folia* alterna, membranacea, glaberrima, nitentia, margine interdum undulationibus minutis notata, cordato-ovato-acuminata vel subdeltoideo-cordata-ovato-acuminato, apice mucronulata, basis sinu lato, aliquomodo ad medium constricta, 7–9-nervia, nervis extimis profunde bifidis, nervulis secondariis reticulatis utrinque distinctis, ad 9–10 cm. longa, 6–10 cm. lata: petiolus glaber, supra parum canaliculatus, 6 cm. longus. *Racemi masculi* simplices, solitarii vel 2–4-ni, 10 cm. longi; flores longius pedicellati, glomerati, 2–5-ni (glomerulis ·75 cm. remotis) sparsim dispositi: pedicelli 3–5 mm. longi (teste Franchetio Savatieroque 5–8 mm. longi). Pedunculus glaber, ad 3 cm. longus; bracteæ ovato-lanceolatæ, ad 2 mm. longæ; bracteolæ suborbiculatæ, glabræ, pedicellis multo breviores. *Perianthii masculi* laciniæ lanceolatæ, obtusiusculæ, refractæ, subæquales. *Stamina* 6, æqualia, perianthio distincte breviora: antheræ didymæ. *Spicæ femineæ* axillares, simplices, solitariæ, usque ad 12–15 cm. longæ, dependentes; flores ad 25, solitarii vel cymulosim bini (alter major alter minor) in ramulis perbrevibus 5–7 mm. distantibus dispositi, deorsum spectantes: rhachis distincte trigona, aliquomodo zigzag. *Perianthii masculi* laciniæ iis floris masculi similes: bracteæ et bracteolæ adsunt. *Capsulæ* assurgentes, latiores quam longæ, basi et apice emarginatæ (teste Franchetio Savatieroque). *Semina* (teste Maximowicz) circumcirca alata.—*Dioscorea tenuipes*, Franchet et Savatier, Enum. Flor. Jap., II., 525. *Dioscorea sativa*, Miq., Prolusio Flor. Jap., (1867), 323, quoad plantam masculam.

SOUTHERN JAPAN. Island of Kiusiu: Nagasaki, *Maximowicz*. Island of Shikoku: Tosa; Nanokawa, *Makino*.

DIOSCOREA YOKUSAI. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, minopere angulati, inermes, virides. *Folia* alterna, membranacea, glaberrima, nitentia, cordato-acuta vel breviter acuminata, apice mucronulata, sinu basis latissimo, margine integra vel plus minus undulata, nonnunquam ad medium constricta, 7-nervia, nervis extimis profunde bifidis, nervulis secondariis reticulatis subtus distinctis, 5 cm. longa, 5 cm. lata: petiolus glaber, gracilis, supra profunde canaliculatus, 3·5 cm. longus. *Inflorescentia mascula* per rhachin angulatam ad 7 cm. longam cymulas 3–5-floras 5–10 mm. remotas gerens: flores distincte pedicellati, pedicellis 2–3 mm. longis: pedunculus glaber, angulatus, 2–3 cm. longus: bracteæ ovato-lanceolatæ, acutæ vel acuminatæ, ad 2 mm. longæ: bracteolæ ovatæ, acutæ, pedicellis multo breviores. *Perianthii masculi* laciniæ biseriatæ, exteriores ovato-lanceolatæ subacutæ, interiores obovatæ obtusæ vel truncatæ, patentes. *Stamina* 6, æqualia, perianthio distincte breviora: antheræ didymæ. *Spicæ femineæ* axillares, simplices, solitariæ, usque ad 8 cm. longæ, dependentes; flores solitarii sessiles, 5–7 mm. distantes, deorsum spectantes: rhachis distincte trigona, aliquomodo zigzag: bracteæ et bracteolæ adsunt. *Perianthii feminei* laciniæ lanceolatæ, subacutæ, subæquales. *Capsulæ* assurgentes, æquilongæ et latæ, maturæ non visæ.

JAPAN. Without precise locality, *Buerger* (mixed with *Dioscorea Batatas* and issued by Miquel as *D. japonica*).

This species is most nearly allied to *D. tenuipes* with which it agrees in the didymous stamens and in the distinctly pedicelled male flowers: but from which it differs markedly in the biseriate perianth, the lobes of which are not refracted, in the rather shorter and stouter pedicels, the thicker and larger perianth-lobes and in the distinctly cymulose (not glomerate) clusters of flowers. The fruits, which we have not seen ripe, when young closely resemble those of *D. tenuipes*. We suspect that this may prove to be the plant for which Uline has proposed the name *D. Buergeri* (teste Diels in Engl. Bot. Jahrb., XXIX., 260), but we have not seen specimens which could corroborate the idea. We have therefore been compelled to find a new name for it, and have thought well to connect the name of the author of the *Somoku Dusets* with it.

DIOSCOREA ENNEANEURA. *Radix* ignota. *Caules* glabri, sinistrorsum volubiles, minopere angulati, inermes, virides. *Folia* alterna, membranacea, supra glaberrima subnitentia, subtus nervis et præcipue nervulis secondariis minute rugoso-cristatis, cordata, breviter acuminata, apice mucronulata, basis sinu obtuso, margine integra, 9-nervia, nervis extimis profunde bifidis, nervulis secondariis distinctis subtus prominulis, 6 cm. longa, 5 cm. dimidio lata: petiolus glaber, gracilis supra canaliculatus, 3·5 cm. longus. *Racemi masculi* simplices, axillares, solitarii; flores solitarii vel bini, distincte pedicellati, sparsim 3–4 mm. remoti, pedicellis 2 mm. longis: pedunculus glaber, 5 mm. longus: rhachis ad 4 vel 5 cm. longus: bracteæ ovato-lanceolatæ, ad 2 mm. longæ: bracteolæ subsimiles, pedicellis dimidio breviores. *Perianthii masculi* laciniæ ovato-lanceolatæ, biseriatæ, exteriores acutæ ad medium incrassatæ, interiores obtusæ vel truncatæ fere ad apicem incrassatæ, patentes. *Stamina* 6, æqualia, perianthio distincte breviora: antheræ didymæ. *Planta feminea* ignota.—*Dioscorea Buergeri*, var. *enneaneura*, Uline ex Diels in Engl. Bot. Jahrb., XXIX., (1900), 260, nomen tantum.

CENTRAL CHINA.—Hupeh. *A. Henry*, 3641 A.

This species is most nearly related to the plant here described as *D. Yokusai*. It differs very markedly in the much smaller flowers which are solitary or geminate, and not cymulose on the rhachis.

From the 'Gard. Chron.' June 17, 1905, *p.* 369.

THE SPECIES OF MECONOPSIS.

[*We are pleased, in view of the great interest now attaching to the genus in horticultural circles, to lay before our readers a brief account of the Asiatic species of Meconopsis from the pen of the recognized authority on the subject, Lieut.-Col. D. Prain, Indian Medical Service, Director of the Royal Botanic Garden, Calcutta.*—Ed.]

THE interest that has lately been taken in the genus Meconopsis, owing to the successful introduction and exhibition of some Chinese species quite worthy of the attention they have received, will remind gardeners that there are a number of Indian species of this genus. Some of these are quite well known in cultivation, others have been introduced to European gardens from time to time, but have failed to persist. Still others have not yet been added to our European garden lists.

These "Poppies" arrange themselves in a few natural groups, which are easily distinguished. There is first of all the group "Aculeatæ," which takes its name from M. aculeata, of the North-western Himalaya, a species quite familiar to English gardeners. Another member of this group is M. horridula, known also in one of its forms as M. racemosa; this is really a Tibetan species, which only overflows into the higher Himalayan valleys along the southern border of Tibet. Though it has been over and over again introduced to European gardens, little success seems to have attended its cultivation. This is not surprising, considering the natural conditions of its existence, and it may be doubted whether any, save those who are in charge of the really alpine gardens in Central Europe, can hope to raise the species successfully. The last member of the group,

M. sinuata, which is the representative in the eastern Himalaya of M. aculeata, has not yet been raised in Europe.

More familiar than the "Aculeatæ" group is the group "Robustæ," which takes its name from M. robusta, a yellow-flowered species from Kumaon. This has been frequently introduced to European gardens, and possibly now exists in more than one collection, though if so it would appear to be somewhat readily mistaken for M. paniculata, another yellow-flowered species which extends from Central Nepal to Bootan. Both species, as references to the literature of the subject will show, have been mistaken for M. nepalensis, a red-flowered species which considerably resembles M. paniculata in externals. This species was apparently known in English gardens before 1880, but had so completely disappeared from cultivation till it was re-introduced by Sir George King, and flowered by the late Mr. Wilson at Weybridge, about twenty years ago, that when it was successfully raised anew it was not recognised, but was taken for a red-flowered form of M. Wallichii. This last species is possibly the most familiar member of the Robustæ group; owing to the pale, somewhat washed-out-purple colour of its petals it is perhaps the least beautiful. But if one may judge from the material available, the finest member of the Robustæ group is M. superba, a white-flowered species from Bootan, which it has not yet been possible to introduce to European gardens.

The "Primulinæ" group takes its name from M. primulina, a species from Bootan and Chumbi, with nodding, blue flowers. This species, which has not yet been introduced to European horticulture, is the only Indian member of its group. In China the group is represented by M. Henrici (sometimes also known as M. principis), which has apparently been introduced to European gardens; and by M. Delavayi, which, like M. primulina, does not seem to be yet known in cultivation.

The group in which most interest is being taken at present is the group "Grandes," which takes its name from M. grandis.

There are two distinct sub-groups within the Grandes—viz., one composed of species with one-flowered, leafless scapes, the other including species whose several-flowered scapes bear leafy bracts. Of the former sub-group India claims but one species, M. simplicifolia, which has long been familiar to European gardeners. It is a native of the Eastern Himalaya, but extends thence into Southern Tibet. The other species of the sub-group are East Tibetan or West Chinese, and of these the most striking is M. punicea, which lovers of Poppies had an opportunity of seeing at the recent Temple Show (see *Gardeners' Chronicle*, Oct. 22, 1904, fig. 130). The sub-group, with leafy bracts on the several-flowered scapes, includes two species only; one of these is M. integrifolia, the yellow-flowered species, whose recent introduction has been so warmly and so deservedly welcomed (see Supplementary Illustration to the *Gardeners' Chronicle*, October 1, 1904); the other is M. grandis, from which the group takes its name. This has been in cultivation now in England for a number of years, but as it apparently has the bad taste not to care for the atmosphere of London, it has not provoked so much remark as M. integrifolia. M. grandis is to be met with in Western Sikkim, towards the head waters of the Rangiet river, not far from the Nepalese frontier. It appears, however, only to occur in the vicinity of the huts occupied in summer by graziers, who say that it is not really a native of Sikkim, but that it was brought thither from Nepal. There would appear to be two forms of the species, because some of the specimens are stated by native collectors to have had red or purple flowers; others are said to have had the flowers blue.

The first European to note the colour of the flowers was Professor Gammie, of Poona. As he found them to be very deep blue, and as native observers are often quite unintentionally misleading recorders of colour "very deep blue" is given in the original account of M. grandis as its colour. It has, however, turned out, as is often the case, that both observations were correct, although the majority of those who have flowered M. grandis have found the flowers to be blue. The late Mr. Thompson, who was the first to flower the species in Europe, happened to succeed with a plant whose flowers were described by him as "vinous-purple," and not blue.

The last group of Indian species is the group "Bellæ," which is represented by a single species, M. bella, the most beautiful member of this interesting genus.—It is a native of Eastern Nepal, and has not yet flowered in Europe so far as is known. [In the Edinburgh Botanic Garden are several seedlings derived from seed obtained in the Calcutta Botanic Garden, some of which it is hoped will flower this year. Ed.] It differs from the other species in having finely-divided foliage like that of a Corydalis, and in affecting the faces of steep cliffs, into the crevices of which its thick root-stocks penetrate horizontally.

[*Reprinted from the* 'JOURNAL OF BOTANY' *for January*, 1906.]

THE GENUS CERATOSTIGMA.

BY LIEUT.-COLONEL D. PRAIN, F.R.S.

THE Plumbaginaceous genus *Ceratostigma* was founded by Bunge in 1834 on a plant collected by himself a few years before in the neighbourhood of Pekin.* The original species (*C. plumbaginoides* Bunge) was subsequently found to occur in and about Shanghai and other Eastern Chinese cities; it attracted sufficient notice to ensure its transmission to Europe, and its establishment in western horticulture. Lindley, shortly after its introduction to England, described and figured it under the name *Plumbago Larpentæ*; † this name is still occasionally associated with it in European gardens.

At least a quarter of a century before Bunge discovered *Ceratostigma plumbaginoides* in North-east China, Salt had found in the Abyssinian highlands another Plumbaginaceous plant, which R. Brown considered to be new, and, without describing it, named *Plumbago eglandulosa*.‡ This plant was again collected by Schimper, in whose collections it and another closely allied form were treated by Hochstetter as the basis of a distinct genus *Valoradia*, first defined in 1842.§

A few years later Boissier, when monographing the *Plumbaginaceæ*,|| showed that, in spite of their remote geographical areas, Bunge's *Ceratostigma* and Hochstetter's *Valoradia* are congeneric. For reasons not now thought adequate, Boissier used Hochstetter's name in preference to that of Bunge; most subsequent writers, however, have adopted the name given by Bunge.

Since Boissier wrote, no Abyssinian material has been received by which we can decide whether Schimper's two Valoradias be, as Hochstetter considered, different plants, or, as Oliver has suggested, merely conditions of one species.¶ We do, however, now know that a species nearly allied to Salt's Abyssinian one, but with a different habit of growth, occurs in Somaliland.

The record, since Boissier wrote, of several additional Asiatic species of *Ceratostigma* has lessened the singularity of distribution commented on by him and other authors. Besides the herbaceous Chinese species known to him, another herbaceous species occurs in Indo-China. A very different shrubby species extends from Western China into Eastern Tibet, while another nearly allied shrubby species occurs in the Eastern Himalaya. A fifth Asiatic species, also a shrub, is endemic in Tibet.

The break in the area occupied by *Ceratostigma* is thus less extensive than was believed to be the case, and although the western edge of the tract occupied by the Asiatic species of the genus is still remote from its African territory, it is not far distant from the eastern limit of the allied genus *Vogelia* Lamk., which extends from India to Arabia and Socotra, and occurs again in South Africa, always in countries that are warmer than those affected by the species of *Ceratostigma*.

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* Bunge, Enum. Pl. Chin. p. 55 (1834).
† Lindley, Gard. Chron. vii. p. 732, with fig. (1847).
‡ Brown in Salt Voy., App. iv. p. lxiv. (1814).
§ Hochstetter in Flora, xxv. 239 (1842).
|| Boissier in DC. Prod. xii. 694 (1848).
¶ Oliver in Flor. Trop. Afr. iii. 487 (1877).

The generic description of *Ceratostigma* given in this paper is based on an examination of the material in the Herbaria of Kew and Calcutta. It is not, as regards the account of the calyx, in accord with the statements of previous writers. Boissier speaks of a pair of marginal nerves in each calyx-segment, and the authors of the *Genera Plantarum* say that each lobe of the calyx is 3-nerved. There is, however, in *Ceratostigma*, as in *Vogelia*, only one nerve in each of the five glumaceous, linear-lanceolate sepals proper. The hyaline membranous web which stretches between and unites the contiguous margins of the individual sepals is, owing to the connivent position which these rigid green parts of the calyx assume, thrown into two distinct longitudinal folds that when first examined look quite like marginal nerves. At the base of the calyx these five green segments are united by the same hyaline tissue; being here very narrow, this hyaline tissue, especially when examined by transmitted light, gives to the calyx as a whole the appearance of being 10-nerved at the base. The hyaline web uniting the rigid glumaceous sepals is readily torn; this may explain the statement that the calyx is deeply 5-fid. It is, however, in all the species, rather shallowly 5-fid.

CERATOSTIGMA Bunge (1834).

Enum. Pl. Chin. 55; Endl. Gen. n. 2175; Meisn. Gen. i. 315 and ii. 227; Benth. & Hook. f. Gen. Pl. ii. 628; Oliv. in Flor. Trop. Afr. iii. 487; Clarke in Flor. Brit. Ind. iii. 481; Pax in Engl. Pflanzenfam. iv. 1, 122.

Valoradia Hochst. (1842). Flora. xxv. 2, 239; Meisn. Gen. Add. 368; Boiss. in DC. Prod. xii. 694; Hook. in Bot. Mag. sub t. 4487.

Calyx anguste tubulosus, breviter 5-fidus e sepalis 5 glumaceis angustis strictis conniventibus compositus; sepala singula 1-nervia, nervis in mucronem acicularem excurrentibus, valvatim disposita marginibus continguis membranâ tenue hyalinâ enervi longitudinaliter 2-plicatâ fere prorsus unitis. *Corolla* hypocraterimorpha tubo elongato calycem superante, limbo patente breviter 5-lobo, lobis obovatis obtusis retusisve, contortis, nervis 5 parum incrassatis corollam a basi ad sinus interlobulares usque percurrentibus. *Stamina* 5 corollæ lobis opposita, tubo parum supra medium affixa; filamenta filiformia; antheræ subexsertæ oblongo-lineares, versatiles, basi discretæ, a latere longitudinaliter apertæ. *Ovarium* oblongum plus minusve 5-gonum vel 5-sulcatum, apice conicum, 1-loculare; stylus terminalis filiformis, apice in ramos 5 introrsum papilloso-stigmaticos, alabastro dextrorsum contortos, mox explanatos divisus; ovulum 1. *Capsula* calyce inclusa, ima basi circumscissa, in valvas 5 a basi ad apicem versus fissilis; albumen parcum. *Frutices* vel *suffrutices*, innovationibus persistentibus vel herbaceis;

divaricato-ramosi; erecti, patuli vel rarissime scandentes; glabri, villosi vel strigosi. *Folia* alterna, margine sæpissime setoso-ciliata. *Flores* bracteati bracteâ concavâ, et 2-bracteolati bracteolis lateralibus, carinato-plicatis, bracteas fere æquantibus, in capitula terminalia vel axillaria bracteis paucis brevioribus vacuis cincta congesti. Species 7–8, 2–3 Africanæ; ceteræ Himalaicæ, Tibeticæ, Sinenses vel Indo-sinenses.

Innovationes e basi perenne lignoso herbaceæ, annuæ; alabastra esquamata; capitula terminalia et axillaria:—
Folia margine ciliato-setoso excepto utrinque glabra . . . 1. *C. plumbaginoides.*
Folia utrinque setosa vel scabrida . . . 2. *C. asperrimum.*
Innovationes e ramis demum lignosæ, persistentes; alabastra squamis coriaceis, diu apud innovationis basem persistentibus induta:—
Squamæ alabastra obtegentes vel innovationum basibus obsitæ numerosæ aciculares, fere pungentes; folia utrinque glabra; capitula terminalia; cortex fissilis; suffrutex intricate ramosus . 3. *C. ulicinum.*
Squamæ alabastra obtegentes vel innovationum basibus obsitæ paucæ ovatæ; cortex haud fissus:—
Frutices erecti; capitula terminalia et axillaria:—
Folia supra glabra vel nervis tantum plus minus hirsuta; subtus ramulisque sparse adpresse hirsuta . . . . 4. *C. minus.*
Folia utrinque ramulisque dense patente fulvo-hirsuta . . . . 5. *C. Griffithii.*
Frutices patuli vel scandentes; folia utrinque ramulisque sparse adpresse setosa:—
Capitula terminalia et axillaria; bracteæ, bracteolæ calycisque lobi vix pungentes; frutex patulus . . . . . . 6. *C. abyssinicum.*
Capitula terminalia; bracteæ, bracteolæ calycisque lobi pungentes; frutex scandens . 7. *C. speciosum.*

1. Ceratostigma plumbaginoides Bunge, Enum. Pl. Chin. 55 (1834); Hemsl. in Journ. Linn. Soc. xxvi. 36 (1889), loc. "Yunnan" excludend.

Plumbago Larpentæ Lind. Gard. Chron. vii. 732 cum ic. (1847); Mohl & Schlecht. Bot. Zeit. vi. 160 (1848); Lem. Flor. des Serres, iv. t. 307 (1848); Boiss. in DC. Prod. xii. 694 (1848).

Valoradia plumbaginoides Boiss. in DC. Prod. xii. 695 (1848); Hook. Bot. Mag. t. 4487 (1850); Maxim. Ind. Pek. in Prim. Flor. Amur. 476 (1859).

China: prope Pekin, *Bunge*! Shanghai, *Fortune*, 33! Chusan, *Cantor*!

2. **Ceratostigma asperrimum** Stapf MSS. in Herb. Kew. *Frutex* humilis ramis sparse foliatis, ramulis angulatis parce adpresse puberulis. *Innovationes* basi esquamatæ, foliola 2–3 basalia foliis multo minora circumambitu tamen iis similia. *Folia* obovato-spathulata, alterna, basi longe et angustius cuneata, apice obtusa,

rigide chartacea, margine setis adpressis obsita, supra setis brevissimis sparsis scabrida, subtus pilis adpressis sparsis aspera, 40–50 mm. longa, 30–35 mm. lata. Florum *glomeruli* in axillis superioribus terminalesque dispositi. *Bracteæ* ovato-acuminatæ extus densius pubescentes. *Calyx* 10–11 mm. longus. *C. plumbaginoides* Coll. & Hemsl. Journ. Linn. Soc. xxviii. 81 (1890) vix Bunge.

Indo-China: in collibus Birmanniæ Shan, apud Tounggyi, 6000 p.s.m., *Collett* !

Species *C. plumbaginoidi* proxima, foliis asperis tamen statim differt.

3. **Ceratostigma ulicinum** Prain. *Frutex* humilis, ramis dense foliatis intricatis, cortice fisso; ramulis subangulatis cortice rufescentibus puberulis. *Innovationes* sæpius abortivæ, basi squamis numerosis subulatis rigidis pungentibus margine breviter spinuloso-setosis in folia normalia gradatim abeuntibus indutæ. *Folia* obovato-lanceolata, alterna, apice spinosa, margine spinuloso-serrata, utrinque glaberrima, 18–22 mm. longa, 5–7 mm. lata. Florum *glomeruli* omnes in capitula oblonga spiciformia terminalia congesti. *Bracteæ* ovato-lanceolatæ cuspidatæ margine spinuloso-setaceæ; bracteolæ nervo medio extus parce spinuloso-setaceæ, ceterum glabræ. *Calyx* 10–11 mm. longus.

Tibet: inter Phari et Shigatze, *Ujyen Gyatsko* ! apud Gyantse, 13,200 p.s.m., *Walton* !

Species valde distincta, squamis numerosis acicularibus insignis.

4. **Ceratostigma minus** Stapf MSS. in Herb. Kew. *Frutex* 2–3-pedalis, ramosus, ramis densius foliatis virgatis, cortice haud fisso teretibus, ramulis cylindricis plus minusve adpresse strigosis. *Innovationes* basi squamis paucis triangulis coriaceis vaginiformibus parce setoso-hirsutis in folia normalia subito abeuntibus obsitæ. *Folia* obovata, alterna, apice mucronulata, margine spinuloso-setosa, supra glabra vel nervo medio nonnunquam etiam nervis lateralibus parce setosa, subtus sparse adpresse setoso-hirsuta, 20–26 mm. longa, 9–16 mm. lata. Florum *glomeruli* in axillis superioribus terminalesque dispositi. *Bracteæ* ovatæ acutæ margine setoso-ciliatæ extus adpresse hirsutæ. *Calyx* 7–9 mm. longus. *C. plumbaginoides* Hemsl. Journ. Linn. Soc. xxvi. 36 (1889), quoad loc. Yunnan tantum, nec Bunge.

China: Yunnan; prope Mo-so-yn, *Delavay* ! Mengtze, *Hancock*, 130 ! in loco vix certo, *Bulleyi mercen.* ! in valle Tong et in locis aliis, *E. H. Wilson* ! Szechuen; prope Ta-chien-lu, *Pratt*, 137 ! *Tibet:* Khamba-la, 16,000 p.s.m., *Walton* ! inter Phari et Shigatze, *Ujyen Gyatsko* !

Species *C. Griffithii* valde accedens; floribus minoribus tomentoque parciore et adpresso satis tamen discrepat.

5. CERATOSTIGMA GRIFFITHII C. B. Clarke in Hook. f. Flor. Brit. Ind. iii. 481 (1882).

Plumbago ? Griff. Itin. 189 (1848).

Bootan: inter Woolooka et Lamnoo, frequens, 8000 p.s.m., *Griffith*, 1007 ! *Chumbi:* apud Paroo, 8000–9000 p.s.m., *Dungboo.*

Speciei præcedenti affinis; differt floribus majoribus, tomento densiore patente, habitu robustiore.

6. CERATOSTIGMA ABYSSINICUM Aschers. in Schweinf. & Aschers. Aufzähl. Nil.-Länd. 288 (1868); Oliv. in Flor. Trop. Afr. iii. 487 (1877).

Valoradia abyssinica Hochst. in Schimp. Un. It. n. 258, nomen (1840); in Flora, xxiv. Intell. Bl. 28, nomen (1841); in Flora, xxv. 2, 289 (1842); Boiss. in DC. Prod. xii. 695 (1848).

V. patula Hochst. in Flora, xxv. 2, 289 (1848), sec. Oliv. l. c.

Plumbago eglandulosa R. Br. in Salt, Voy. App. iv. p. lxiv, nomen (1814).

Abyssinia: loc. vix cert., *H. Salt*! in Herb. Mus. Brit. in monte Scholoda, *Schimper*, 258! Athena am Asaba, *Steudner*, 1329! Erithræa, prope Acrour, *Schweinfurth & Riva*, 1010!

7. **Ceratostigma speciosum** Prain. *Frutex* scandens, ramosus, ramis sparse foliatis, cortice haud fisso teretibus, ramulis subcylindricis densius adpresse fulvo-pubescentibus. *Innovationes* basi squamis paucis, ovatis, coriaceis, vaginæformibus, substrigosis, subito in folia normalia abeuntibus obsitæ. *Folia* obovata, alterna, apice abrupte acuminata, mucronata, basi cuneata, margine spinuloso-setosa, supra minute adpresse puberula, subtus adpresse strigosa, 30–40 mm. longa, 15–25 mm. lata. Florum *glomeruli* terminales vel subterminales. *Bracteæ* lanceolatæ margine setoso-ciliatæ, extus adpresse strigosæ. *Calyx* dentibus pungentibus, 18–20 mm. longus.

Somalia: in sepibus nemoribusque scandens, *Dna. Lort Phillips*! *Dna. Cole*! apud Hadrawal, *A. Donaldson Smith*!

Species *C. abyssinico* proxima; differt foliis latioribus, habitu scandente, tomento densiore, floribus manifeste majoribus, capitulis omnibus terminalibus subterminalibusve nullis plane axillaribus.

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